



MADERA COUNTY RIVERSTONE FIRE STATION PROJECT

RFP #2026-03

Project Manual

Construction Documents



MONDAY, MAY 4, 2026

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SECTION 001113
ADVERTISEMENT FOR BIDS

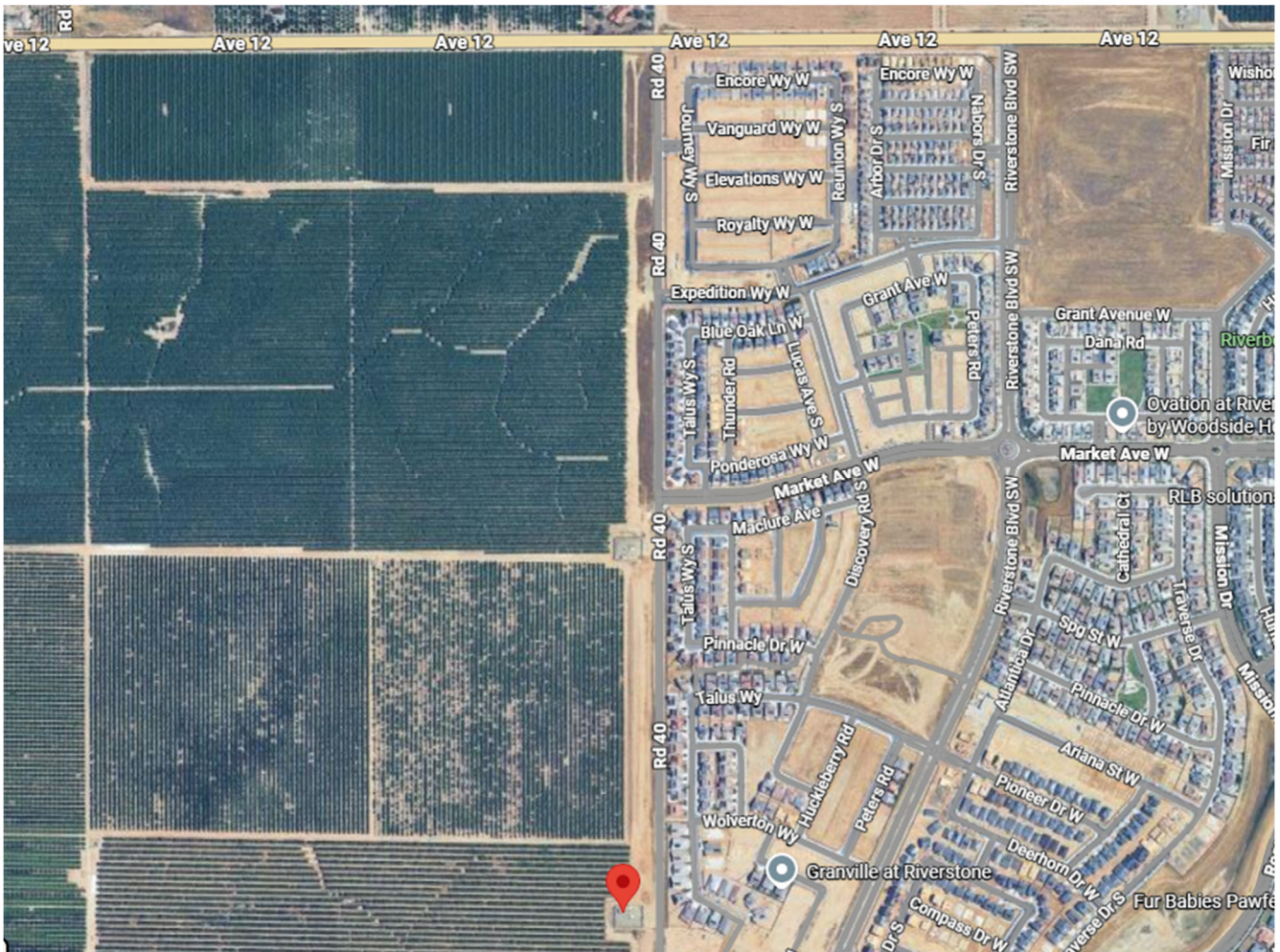
**Madera County Riverstone Fire Station
RFP #2026-03**

NON-MANDATORY PRE-BID CONFERENCE:
Thursday, May 14, 2026 at 11:00 AM

BID OPENING DATE:
Wednesday, June 10, 2026 by 3:00 PM

NOTICE IS HEREBY GIVEN that the **General Services Department, County of Madera**, California, acting by and through its Governing Board, hereinafter referred to as the County, will receive up to, but not later than **3:00:00 p.m., PDT, Wednesday, June 10, 2026** sealed bids for the award of a contract for: Project: Madera County Riverstone Fire Station.

PROJECT LOCATION: Intersection of Avenue 12 and Road 40 (36°54'43.1"N 119°49'17.8"W). Approx ¾ miles on Road 40 off Avenue 12. Project is located near the Riverstone Housing Development.



NON-MANDATORY PRE-BID CONFERENCE: A non-mandatory pre-bid meeting has been scheduled **Thursday, May 14, 2026, at 11:00 AM, PDT** to review the Project's existing conditions. The pre-bid meeting will take place at the project site located near the intersection of Avenue 12 and Road 40 (36°54'43.1"N 119°49'17.8"W).

EXAMINATION OF SITE: Each bidder shall examine the site of work before bidding and shall be responsible for having acquired full knowledge of the job and of all problems affecting it. No variations or allowances from the contract sum will be made because of lack of such examination.

PROJECT DESCRIPTION: CONSTRUCTION OF A NEW FIRE STATION FOR THE COUNTY OF MADERA. WORK INCLUDES (BUT IS NOT LIMITED TO): ON SITE IMPROVEMENTS, NEW FIRE STATION BUILDING, MECHANICAL, PLUMBING, FIRE PROTECTION & ALARM, VEHICLE EXHAUST, EMERGENCY GENERATOR, COMMUNICATIONS, AND ELECTRICAL SYSTEMS, OFF SITE IMPROVEMENTS AS PART OF CONTRACT INCLUDES, BUT IS NOT LIMITED TO: NEW CURB CUTS, NEW SEWER LATERAL TO EDGE OF GUTTER, NEW GAS CONNECTIONS AND NEW ELECTRICAL CONDUIT STUBBED TO EDGE OF GUTTER.

CONSTRUCTION COST ESTIMATE: \$9,780,000.00

CONTRACTORS LICENSE: The Contractor shall possess a valid California Class B license at the time this Project is bid. Each bidder shall be a licensed contractor pursuant to the Business and Professions Code and shall be licensed in the appropriate classification(s) of contractor's license(s), for the work bid upon, and must maintain the license throughout the duration of the Contract.

QUESTIONS: All contractual and technical questions should be directed to the, Project Manager, Jorge Mendoza at jorge.mendoza@maderacounty.com and Ricky Arredondo at ricky.arredondo@maderacounty.com. Questions shall be submitted on the "REQUEST FOR CLARIFICATION" form provided in the Contract Documents.

BID DOCUMENTS: Each bid must conform and be responsive to the Contract Documents and all plans, specifications and any other documents pertaining to the Project, copies of which are now on file and may be obtained on or after April 29, 2026. Contractors may request plans, specifications, and any other documents pertaining to the Project, copies of which are now on file and may be obtained on or after April 29, 2026 via the County's website: <https://www.bidnetdirect.com/california/maderacounty>. Copies are also available through the builder exchange websites. Contact the Project Manager, Jorge Mendoza at (559) 474-3321 or jorge.mendoza@maderacounty.com with any issues locating Contract Documents.

BID SUBMITTAL INSTRUCTION: Bids shall be received in the office of the County of Madera, County Administrative Office, General Services Department, 200 West 4th Street, 4th Floor Suite 4200, Madera, California 93637, Attn.: Jorge Mendoza and shall be opened and publicly read aloud at the above-stated time.

PAYMENT AND PERFORMANCE BOND: The successful bidder will be required to furnish the County with a Performance Bond equal to 100% of the successful bid, and a Payment Bond equal to 100% of the successful bid, prior to execution of the Contract. All bonds are to be secured from a surety company that meets all of the State of California bonding requirements, as defined in Code of Civil Procedure Section 995.120, and is authorized by the State of California, and all documents required by Code of Civil Procedure Section 995.660, to the extent required by law.

SUBSTITUTION OF SECURITIES: Pursuant to the provisions of Public Contract Code Section 22300, the successful bidder may substitute certain securities for funds withheld by County to ensure his performance under the Contract. At the request and expense of the successful bidder, securities equivalent to any amount withheld shall be deposited at the discretion of County, with either County or a state or federally chartered bank, as the escrow agent, who shall then pay any funds otherwise subject to retention to the successful bidder. Upon satisfactory completion of the Contract, the securities shall be returned to the successful bidder.

PREVAILING WAGES: The Director of Industrial Relations has determined the general prevailing rate of per diem wages in the locality in which this work is to be performed for each craft or type of worker needed to execute the Contract which will be awarded to the successful bidder, copies of which are on file and will be made available to any interested party upon request. A copy of these rates shall be posted at the job site. It shall be mandatory upon the bidder to whom the Contract is awarded, and upon any subcontractor under him, to comply with all Labor Code provisions, which include, but are not limited to the payment of not less than the said specified rates to all workers employed by them in the execution of the Contract, employment of apprentices, hours of labor and debarment of contractors and subcontractors.

REGISTRATION: This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations. No contractor or subcontractor may be listed on a bid proposal for a public works project or

awarded a contract for public work on a public works project, unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5. The County shall not accept a bid or enter into a contract without proof of contractor's and subcontractor's current registration. All contractors must furnish electronic certified payroll records to the Labor Commissioner in the eCPR data system, or equivalent as authorized by the Labor Commissioner.

WITHDRAWAL OF BIDS: The County reserves the right to reject any or all bids or to waive any irregularities or informalities in any bids or in the bidding. No bidder may withdraw his/her bid for a period of sixty (60) days after the date set for the opening thereof.

BID SELECTION: The County shall award the Contract for the Project to the bidder submitting the responsive lowest bid as determined from the base bid and is deemed responsible by the County. Basis of award will be Base Bid.

CONSTRUCTION TIME: The successful CONTRACTOR (after receiving the Notice to Proceed) shall have **fourteen (14)** calendar months to complete all work called for under the Contract Documents.

LIQUIDATED DAMAGES: The liquidated damages will be **\$2,000.00** per day for the project delays that are determined to be attributable to the CONTRACTOR.

Clerk of the Board of Supervisors
County of Madera, California

Publication Dates: Monday, May 4, 2026

END OF DOCUMENT

SECTION 00 21 13
INSTRUCTION TO BIDDERS

1. Preparation of Bid Form

The County invites bids on the attached form to be submitted at such time and place as is stated in the Advertisement for Bids. All blanks in the bid form must be appropriately filled in. All bids must be submitted in sealed envelopes bearing on the outside the name of the bidder, his address, and the name of the Project for which the bid is submitted. All prices must be stated in both words and figures where so indicated, and where there is a conflict in the words and figures, the words shall govern. Prices, wording, and notations must be in ink or typewritten. It is the sole responsibility of the bidder to see that his bid is received in proper time. All bids received after the scheduled closing time for receipt of bids will be returned to the bidder unopened.

2. Bid Security

Each bid shall be accompanied by: (a) cash; (b) a certified check made payable to the County; (c) a cashier's check made payable to the County; or (d) a satisfactory bid bond payable to the County executed by the bidder as principal and an admitted surety approved to conduct business in the State of California as surety, in an amount not less than 10% of the maximum amount of the bid. Personal sureties and unregistered surety companies are unacceptable. The California admitted surety insurer, as defined in Code of Civil Procedure Section 995.120, shall be a satisfactory corporate surety. The cash, check or bid bond shall be given as a guarantee that the bidder shall execute the Contract if it be awarded to the bidder in conformity with the Contract Documents and shall provide the surety bond or bonds as specified therein within ten (10) consecutive calendar days after notification of the award of the Contract to the bidder (which date shall be the day following the Board of Supervisors approval of the award).

In the event the bidder to whom the Notice of Intent to Award Contract is given fails or refuses to post the required bonds, as provided in Section 10 below, and return executed copies of the Contract within ten (10) consecutive calendar days from the date of notification of Award of Contract. The County may declare the bidder's bid deposit or bond forfeited as damages caused by the failure of the bidder to post the required bonds and execute such copies of the Contract and may award the Contract to the next lowest responsible bidder or may call for new bids.

3. Faxed and Electronic Mail Bids

All bids must be under sealed cover. The County will not accept any bids or bid modifications submitted by facsimile or electronic mail transmission.

4. Signature

The bid must be signed in the name of the bidder and must bear the signature in longhand of the person or persons duly authorized to sign the bid on behalf of the bidder. All signatures are to be in ink. In the event that the bidder is a joint venture or partnership, there shall be submitted with the bid certifications signed by authorized officers of each of the parties to the joint venture or partnership, naming the individual who shall be the agent of the joint venture or partnership, who shall sign all necessary documents for the joint venture or partnership and who, should the joint venture or partnership be the successful bidder, shall act in all matters relative to the Contract resulting therefrom for the joint venture or partnership.

5. Modifications

Changes in or additions to the bid form, recapitulations of the work bid upon, alternative proposals, or any other modification of the bid form which is not specifically called for in the Contract Documents may result in the County's rejection of the bid as not being responsive to the invitation to bid. No oral or telephonic modification of any bid submitted will be considered and a telegraphic modification may be considered only if the postmark evidence that a confirmation of the telegram duly signed by the bidder was placed in the mail prior to the opening of bids. Bids may be rejected if they show any alteration in form, are incomplete, or contain irregularities of any kind.

6. Erasures/Mutilation of Bid Documents

The bid submitted must not contain any erasures, interlineations, or other corrections unless each such correction is suitably authenticated by affixing in the margin immediately opposite the correction the surname or surnames of the person or persons signing the bid.

Bidders should not deface or mutilate the bid documents to the extent that they may not be usable for construction purposes.

7. Examination of Site and Contract Documents

At its own expense and prior to submitting its bid, each bidder shall visit the site of the proposed work and fully acquaint himself with the conditions relating to the construction and labor so that the bidder may fully understand the facilities, which include but are not limited to difficulties, and restrictions attending the execution of the work under the Contract. Bidders shall thoroughly examine and be familiar with the drawings and specifications. Each bidder shall also determine the local conditions which may, in any way affect the performance of the work, including the prevailing wages and other relevant cost factors; familiarize itself with all federal, state and local laws, ordinances, rules, regulations and codes affecting the performance of the work, including the cost of permits and licenses required for the work; make such surveys and investigations, including investigations of subsurface or latent physical conditions at the site or where work is to be performed. The failure or omission of any bidder to receive or examine any Contract Documents, form, instrument, addendum, or other document or to visit the site and acquaint himself with conditions there existing shall in no way relieve any bidder from any obligation with respect to their bid or to the Contract. The submission of a bid shall be taken as incontrovertible evidence of compliance with this section.

8. Withdrawal of Bids

Any bidder may withdraw his bid either personally, by written request, or by telegraphic request confirmed in the manner specified above at any time prior to the scheduled closing time for receipt of bids. Any request to withdraw a bid shall be so worded so as not to reveal the amount of the original bid. Withdrawn bids may be resubmitted until the scheduled time for receipt of bids, so long as the resubmitted bids are in full conformance with the Contract Documents. After the scheduled closing time for receipt of bids, a bidder may not withdraw its bid until the expiration of sixty (60) calendar days, after which time a bid may be withdrawn only in writing and in advance of actual award of the Contract.

9. Contracts and Bonds

The Contract form which the successful bidder, as Contractor, will be required to execute, and the form of the Performance Bond equal to 100% of the successful bid, and Payment Bond equal to 100% of the successful bid which the bidder will be required to furnish at the time of execution of the Contract, are included in the Contract Documents and should be carefully examined by the bidder. The Performance and Payment Bonds must be executed by an admitted Surety approved to conduct business in the State of California, pursuant to Code of Civil Procedure Section 995.120. In addition, to the extent required by law, the Payment and Performance Bonds must be accompanied by a certified copy of the certificate of authority of the insurer issued by the Insurance Commissioner of the State of California, a certificate from the Clerk of the County of Madera that the certificate of authority of the insurer has not been surrendered, revoked, cancelled, annulled, or suspended, or if it has that it has been renewed, and four copies of the insurer's most recent annual statement and quarterly statement filed with the Department of Insurance of the State of California.

10. Interpretation of Plans and Documents

If any person contemplating submitting a bid for the proposed Contract is in doubt as to the true meaning of any part of the drawings, specifications, or other Contract Documents, or finds discrepancies in, or omissions from the drawings and specifications, that person may submit to the Project Manager a written request for an interpretation or correction thereof. Such submittal must be made on the "REQUEST FOR CLARIFICATION" form provided within Contract Documents, and must be submitted to the Project Manager, Ricky Arredondo Ricky.Arredondo@maderacounty.com

The person submitting the request will be responsible for its prompt delivery. Any interpretation or correction of the Contract Documents will be made only by addendum duly issued. Any addenda or bulletins issued by the Architect during the time of bidding or forming a part of the documents furnished to bidders for bid preparation shall be covered in the bid and made part of the Contract Documents. In the event that an addendum or bulletin, setting forth material changes, additions or deletions is issued when there is 72 hours or less to the bid deadline, the County will extend the bidding deadline by at least 72 hours. No person is authorized to make any oral interpretation of any provision in the Contract Documents to any bidder, and no bidder is authorized to rely on any such unauthorized oral interpretation.

11. 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 for the same work unless alternate bids are specifically called for. A person, firm, or corporation that has submitted a sub-proposal to a bidder, or that has quoted prices of materials to a bidder, is not thereby disqualified from submitting a sub-proposal or quoting prices to other bidders or making a proposal.

12. Noncollusion Affidavit

Bidders on all public works contracts are required to submit an affidavit of Noncollusion with their bid. This form is included with the bid package and must be signed under the penalty of perjury and dated.

13. Reservation

The County reserves the right to reject any or all bids, or to waive any irregularities or informalities in any bids or in the bidding.

14. Award of Contract

The award of the Contract, if approved by the County Board of Supervisors, will be to the lowest responsible bidder whose bid complies with all of the prescribed requirements, based on the base bid in accordance with Public Contract Code Section 20103.8.a and the Contract Documents. However, the County may elect to exclude, at its discretion, any or all of the bid alternates from the final contract.

15. Listing Subcontractors

Each bidder shall set forth on the form provided herein and submit with its sealed bid at the time bids are due the name, the location of place of business, and the California contractor license number of each subcontractor who will perform work, labor, furnish materials, or render service to the bidder on said Contract in excess of one-half (1/2) of one percent (1%) of the total bid. An inadvertent error in listing the California contractor license number shall not be grounds for filing a bid protest or grounds for considering the bid nonresponsive if the corrected contractor's license number is submitted to the public entity by the prime contractor within 24 hours after the bid opening and provided the corrected contractor's license number corresponds to the submitted name and location for that subcontractor. No time extension will be allowed for submission of additional information required by this Section.

16. Evidence of Responsibility

If bidders were not required to pre-qualify prior to being allowed to bid on the Project, the following information will be required to accompany bids submitted to the County: Each bid shall be supported by a statement of the bidder's experience as of recent date on the form entitled "BIDDER'S QUALIFICATIONS," bound herein. County may also consider the qualifications and experience of subcontractors and other persons and organizations (including those who are to furnish the principal items of material and equipment) proposed for those portions of the work. Operating costs, maintenance considerations, performance data and guarantees of materials and equipment may also be considered by the County. In this regard, the County may conduct such investigations as the County deems necessary to assist in the evaluation of any bid and to establish the responsibility, qualifications and financial ability of the bidder, proposed subcontractors, and other persons and organizations to do the work in accordance with the Contract Documents to the County's satisfaction within the prescribed time; the County reserves the right to reject the bid of any bidder who does not pass any such evaluation to the satisfaction of the County.

17. Workers' Compensation

In accordance with the provisions of Section 3700 of the Labor Code, Contractor shall secure the payment of compensation to his employees. Contractor shall sign and file with the County the following certificate prior to performing the work under this Contract:

I am aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this Contract.

The form of such certificate, Contractors Certificate Regarding Workers Compensation, is included as part of the Contract Documents.

18. Substitution of Security

The Contract Documents call for monthly progress payments based upon the percentage of the work completed. The County will retain five percent (5%) of each progress payment as security for completion of the work. At the request and expense of the successful bidder, the County will substitute securities for the amount so retained in accordance with Public Contract Code Section 22300 and the Contract Documents.

19. Prevailing Wages

The County has obtained from the Director of the Department of Industrial Relations the general prevailing rate of per diem wages in the locality in which this work is to be performed for each craft or type of worker needed to execute the Contract. These rates are on file at www.dir.ca.gov. Copies

may be obtained on request. Bidders are advised that a copy of these rates must be posted at each job site.

20. Debarment of Contractors and Subcontractors

In accordance with the provisions of the Labor Code, Contractors or subcontractors may not perform work on a public works project with a subcontractor who is ineligible to perform work on a public project pursuant to Section 1777.1 or Section 1777.7 of the Labor Code. Any contract on a public works project entered into between a contractor and a debarred subcontractor is void as a matter of law. A debarred subcontractor may not receive any public money for performing work as a subcontractor on a public works contract. Any public money that is paid or may have been paid to a debarred subcontractor by a contract on the Project shall be returned to the County. The successful bidder, as Contractor, shall be responsible for the payment of wages to workers of a debarred subcontractor who has been allowed to work on the Project.

21. Contractor's License

To perform the work required for this Project, bidders must possess the appropriate Contractor's License for the portion of the work bid upon, and bidders must maintain the license throughout the duration of the Contract. If, at the time the bids are opened, bidder is not licensed to perform the Project in accordance with division 3, chapter 9 of the Business and Professions Code and the Advertisement for Bids, the bid will not be considered.

The first payment for work or material under any contract shall not be made unless and until the Registrar of Contractors verifies to the County that the records of the Contractor's State License Board indicate that the Contractor was properly licensed at the time the contract was awarded. Any bidder or contractor not so licensed shall be subject to all legal penalties imposed by law, including, but not limited to, any appropriate disciplinary action by the Contractor's State License Board. Failure of the bidder to obtain proper and adequate licensing for an award of a contract shall constitute a failure to execute the contract and shall result in the forfeiture of the security by the bidder.

22. Storm Water Permit for Construction Activity

Required

23. Bid Deposit Return

The County will return the security accompanying the bids of all unsuccessful bidders no later than sixty (60) calendar days after award of the Contract.

24. Insurance

Prior to commencement of the work the successful bidder shall purchase and maintain insurance as set forth in the General Conditions, in the amounts the specified in the Supplementary Conditions to these Contract Documents, and in a form acceptable to the County, from a company or companies lawfully authorized to do business in California as admitted carriers having an "A" policy holders rating and a financial size rating of at least Class VII in accordance with the most current Best's Key Rating Guide, Property-Casualty. Such insurance shall be adequate to protect themselves from claims under Workers' Compensation Acts, and from claims from damages for personal injury, including death, and damage to property, which may arise from operations under the Contract and from the ownership, maintenance or uses of motor vehicles, or claims involving blanket contractual liability applicable to the successful bidder's obligations under the Contract Documents, and completed operations, independent contractors, and Broad Form Property damage, without exclusion for collapse, explosion, demolition, underground coverage, and excavating. The successful bidder shall be required to file with the County certificates of such insurance, and shall name, by way of endorsement on any policy of insurance, the County, Construction Manager, and Architect as additional insured. Failure to furnish such evidence of insurance may be considered default by the successful bidder.

25. Request For Substitutions

- a. For purposes of this provision the term "substitution" shall mean the substitution of any material, product, thing or service that is substantially equal or better in every respect to that so indicated or specified in the specifications.
- b. Pursuant to Public Contract Code Section 3400(b) the County may make a finding designating certain materials, products, things, or services by specific brand or trade name for the statutorily enumerated purposes. As required by Section 3400 (b) the County may have made such findings as may be further described in the Supplementary Conditions. These findings if made, as well as the materials, products, things, or services and their specific brand or trade names that must be used for the Project may be found in the Supplementary Conditions, if applicable.

- c. Unless specifically designated in the General Conditions, whenever in specifications any material, product, thing or service is indicated or specified by grade, patent, or proprietary name or by name of manufacturer, such specifications shall be deemed to be used for the purpose of facilitating the description of the material, product thing, or service desired and shall be deemed to be followed by words "or equal." Bidders may, unless otherwise stated, offer for substitution any material, product, thing, or service which shall be substantially equal or better in every respect to that so indicated or specified. However, the County has adopted certain uniform standards for certain materials, products, things, and/or services. If any material, product, thing, or service offered for substitution by Bidders is not, in the opinion of the Architect and the County, substantially equal or better in every respect to that specified, Bidders shall furnish the material, product, thing, or service specified. The burden of proof as to the equality of any material, product, thing, or service shall rest with the Bidders.
- d. Bidders shall submit requests together with substantiating data for substitution of any "or equal" material, product, thing, or service no later than 5 days prior to the bid date. Provisions authorizing submission of "or equal" substitution justification data shall not in any way authorize an extension of time for performance of this Contract. Furthermore, if a proposed "or equal" substitution request is rejected, a Bidder shall be responsible for including the specified material, product, thing, or service in its bid. The County shall not be responsible for any costs of Bidders associated with "or equal" substitution requests. The County has the complete and sole discretion to determine if a material, product, thing, or service is an "or equal" material, product, thing, or service that may be substituted.
- e. For purposes of subdivision (d) above, data required to substantiate requests for substitutions of an "or equal" material, product, thing, or service data shall include a signed affidavit from the Bidder stating that the substituted "or equal" material, product, thing, or service is equivalent to that specified in the specification in every way except as listed on the affidavit. Substantiating data shall also include any and all illustrations, specifications, and other relevant data including catalogue information which describes the requested substituted "or equal" material, product, thing, or service and substantiates that it is an "or equal" to the material product, thing, or service specified. In addition, the submittal documentation must also include a statement of the cost implications of the substitution being requested stating whether and why the substitution of the "or equal" material, product, thing, or service will reduce or increase the Contract Price. The substantiating data must also include information regarding the durability and lifecycle cost of the requested substituted "or equal" material, product, thing, or service. Failure to submit all the needed substantiating data, including the signed affidavit, to the Architect in a timely fashion so that the substitution can be adequately reviewed may result in the rejection of the proposed substitution. The Architect is not obligated to review multiple substitution submittals for the same materials, products, things, or services due to the Bidder's failure to submit a complete package initially.
- f. Time limitations in this Article must be complied with strictly and in no case will an extension of time for completion be granted because of Bidder's failure to request the substitution of an alternative item at the times and manner set forth herein in subdivision (d). Further, the Bidder shall bear the costs of all engineering work associated with the review of submittals for substitution of equals.
- g. In event Bidder furnishes material, product, thing, or service more expensive than that specified, the difference in cost of such material, product, thing, or service so furnished shall be borne by the Bidder.

26. Anti-Discrimination

It is the policy of the County that in connection with all work performed under contracts, there be no discrimination against any prospective or active employees engaged in the work because of race, color, ancestry, national origin, religious creed, sex, age or marital status. The successful bidder agrees to comply with applicable Federal and California laws including, but not limited to, the California Fair Employment Practice Act, beginning with Government Code 12900, and Labor Code 1735. In addition, the successful bidder agrees to require like compliance by any subcontractors employed on the work by him.

27. Pre-Bid Meeting

A non-mandatory pre-bid meeting has been scheduled for Thursday, May 14, 2026 at 11:00 AM to review the Project's existing conditions. The pre-bid meeting will take place near the intersection of

Avenue 12 and Road 40 (36°54'43.1"N 119°49'17.8"W). Representatives of the County, Architect and consulting engineers may be present to answer any questions bidders have regarding this Project.

All questions regarding this project shall be in writing and shall be received by the Project Manager, no later than **5:00 PM, Friday May 29, 2026**. Questions shall be submitted on the "REQUEST FOR INTERPRETATION" form provided in the Contract Documents and shall be submitted to the Project Manager Jorge Mendoza at jorge.mendoza@maderacounty.com and Ricky Arredondo at ricky.arredondo@maderacounty.com.

28. No Telephone Availability

Bidders are advised that on bid date telephones WILL NOT be available at the County Administrative Offices for use by bidders or their representatives.

29. Ethics in Bidding.

The County expects the bidders to maintain high ethical standards in engaging in the competitive bidding process. The bid amount of one bidder should not be divulged to another before the award of the subcontract or order, nor should it be used by bidders to secure a lower proposal from another bidder on that project (bid shopping). Subcontractors or Suppliers should not request information for the bidder regarding any sub-bid in order to submit a lower proposal on that project (bid peddling). The County will consider any bidder found to be engaging in such practices to be a non-responsible bidder and may reject its bid on that ground.

30. Contract Procedures.

a. The Contract Documents contemplate the following procedures upon receipt of bid:

1. The County will give the successful bidder a Notice of Award of Contract.
2. Following the giving of the Notice of Award of Contract, the successful bidder shall post the Performance and Payment Bonds, provide certificates of insurance, and other certificates, and return executed copies of bonds and Contracts to the County pursuant to the timelines specified herein.

END OF DOCUMENT

SECTION 00 21 13.1
Contractor RFC Form

CONTRACTOR REQUEST FOR CLARIFICATION
PROJECT: MADERA COUNTY RIVERSTONE FIRE STATION

Requests for clarification of the plans and specifications regarding this project shall be submitted on this form. Any change or clarification of the project plans and specifications shall be in the form of a written addendum issued to plan holders of record.

Contractors requesting clarification shall complete the following:

FIRM NAME: _____

SENDER/CONTACT NAME: _____

MAILING ADDRESS: _____

ZIP CODE: _____ BUSINESS PHONE: (_____) _____

EMAIL: _____

Type or print questions below and email form to:

jorge.mendoza@maderacounty.com and ricky.arredondo@maderacounty.com

Sheet #: _____ Detail #: _____ Specification Section #: _____

This form may be removed from the project specifications and/or reproduced as needed.

Date Received: _____ **Time Received:** _____ am / pm **RFC Number:** _____

RESPONSE:

[END OF DOCUMENT 00 21 13.1]

SECTION 004113
BID FORM

Company

BID TO: County of Madera, acting by and through its Board of Supervisors, herein called the "County":

1. Pursuant to and in compliance with your Notice to Contractors Calling for Bids and the other documents relating thereto, the undersigned Bidder, having thoroughly examined and familiarized himself with the terms of the Contract, the local conditions affecting the performance of the Contract and the cost of the work at the place where the work is to be done, and with the drawings and specifications and other Contract Documents, hereby proposes and agrees to perform, within the time stipulated, the Contract, including all of its component parts, and everything required to be performed, including its acceptance by the County and to provide and furnish any and all of the labor, materials, tools, expendable equipment, and all utility and transportation services necessary to perform the Contract and complete in a workmanlike manner all of the work required in connection with the Project described below:

All in strict conformity with the drawings and specifications and other Contract Documents, including addenda nos. listed below and on file at the office of the said County.

COMPANY NAME:	
Project:	Madera County Riverstone Fire Station
All prices shall be submitted as Lump Sum Prices written in words, and figures. In the event of discrepancy between the words and figures of the Lump Sum Price, words shall prevail. All sums shall include all applicable taxes and costs.	

BASE BID:	
	\$
<i>Price in Words</i>	<i>Price in Figures</i>
ADD ALTERNATE NO. 1 - Bus Charging Stations and Associated Work	\$
<i>Price in Words</i>	<i>Price in Figures</i>

Acknowledgement of Addendum:	
Addendum No. _____ Dated _____	Addendum No. _____ Dated _____
Addendum No. _____ Dated _____	Addendum No. _____ Dated _____
Addendum No. _____ Dated _____	Addendum No. _____ Dated _____

2. It is understood that the County reserves the right to reject this bid and that this bid shall remain open and not be withdrawn for the period specified in the Advertisement for Bids.
3. Attached is the required bid security in the amount of not less than 10% of the Bid: \$_____. Bid bond, certified check, cashier's check, or cash (circle one).
4. Non-collusion affidavit is attached hereto.
5. The required list of proposed subcontractors is attached hereto.
6. It is understood and agreed that if written notice of the acceptance of this bid is mailed, telegraphed, or delivered to the undersigned after the opening of the bid, and within the time this bid is required to remain open, or at any time thereafter before this bid is withdrawn, the undersigned will execute and deliver to the County a contract in the form attached hereto in accordance with the bid as accepted. The undersigned will submit the executed Contract, Performance Bond and Payment Bond for Public Works, and insurance Certificates as specified, all within ten (10) consecutive calendar days after notification of award of Contract. The work under the Contract shall be commenced by the undersigned bidder, if awarded the contract, on the date to be stated in the County's Notice to the Contractor to Proceed and shall be completed by the Contractor in the time specified in the Contract Documents. The Contractor shall not start work on the Project until all paperwork required herein is timely and correctly submitted to the County. No time extensions shall be granted to Contractor for Contractor's failure to comply with these provisions.
7. Notice of acceptance or requests for additional information should be addressed to the undersigned at the address stated below:

8. The names of all persons interested in the foregoing proposal as principals are as follows:

(IMPORTANT NOTICE: If bidder or other interested person is a corporation, state legal name of corporation, also names of the president, secretary, treasurer, and manager thereof; if a copartnership, state true name of firm, also names of all individual copartners comprising the firm; if bidder or other interested person is an individual, state first and last names in full.)

9. Bidder certifies that he is licensed in accordance with the law providing for the registration of Contractors, License No. _____, Expiration Date _____, class of license _____. If the bidder is a joint venture, each member of the joint venture must include the above information.

Public Works Contractor Registration Number: _____

10. Pursuant to Section 7103.5 of the Public Contract Code submitting a bid to the County, the bidder offers and agrees that if the bid is accepted, it will assign to County all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Section 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, materials, or services by the bidder for sale to the purchasing body pursuant to the bid. Such assignment shall be made and become effective at the time the purchasing body tenders final payment to the bidder.

Proper Name of Bidder

Address

Signature of Bidder

Date

Note: If bidder is a corporation or partners authorized to sign contracts on behalf of the partnership; and if bidder is an individual, the bidder's signature shall be placed above. If bidder is a corporation, affix corporation seal.

I, _____ the _____ of the bidder, hereby certify under penalty of perjury under the laws of the State of California, that all of the information submitted by the bidder in connection with this bid and all of the representations made herein are true and correct. Executed on this _____ day of _____ at _____ County, California.

Proper Name of Bidder _____

By _____

Signature of Bidder _____

Bidder must submit the following documents with this Bid Form, or the County may deem the Bid nonresponsive:

- Proposed Subcontractors Form
- Bidders Qualifications
- Non-Collusion Affidavit
- Contractor's Certification Regarding Workers' Compensation
- Bid Bond
- Department of Industrial Relations - Public Works Contractor Registration Number

END OF SECTION 00 41 13

**SECTION 00 43 36
PROPOSED SUBCONTRACTORS FORM**

In compliance with the Subletting and Subcontracting Fair Practices Act (chapter 4 (commencing at Section 4100), part 1, division 2 of the Public Contract Code of the State of California) and any amendments thereof, each bidder shall set forth below: (a) the name, the location of the place of business, and the California contractor license number and (b) the portion of the work which will be done by each subcontractor who will perform work or labor or render service to the contractor in or about the construction of the work or improvement to be performed under this Contract or a subcontractor licensed by the State of California who, under subcontract to the contractor, specially fabricates and installs a portion of the work or improvement according to detailed drawings contained in the plans and specifications in an amount in excess of one-half (1/2) of one percent (1%) of the contractor's total bid or ten thousand dollars (\$10,000), whichever is greater. The contractor shall list only one subcontractor for each such portion as is defined by the contractor in this bid. An inadvertent error in listing the California contractor license number shall not be grounds for filing a bid protest or grounds for considering the bid nonresponsive if the corrected contractor's license number is submitted to the public entity by the prime contractor within 24 hours after the bid opening and provided the corrected contractor's license number corresponds to the submitted name and location for that subcontractor. No time extension will be allowed for submission of information required by this document.

If a contractor fails to specify a subcontractor or if a contractor specifies more than one subcontractor for the same portion of work to be performed under the Contract in excess of one-half (1/2) of one percent (1%) of the contractor's total bid, or ten thousand dollars (\$10,000), whichever is greater, he shall be deemed to have agreed that he is fully qualified to perform that portion himself, and that he shall perform that portion himself.

No contractor whose bid is accepted shall (a) substitute any subcontractor, (b) permit any subcontract to be voluntarily assigned or transferred or allow it to be performed by anyone other than the original subcontractor listed in the original bid, or (c) sublet or subcontract any portion of the work in excess of one-half of one percent of the contractor's total bid as to which his original bid did not designate a subcontractor, except as authorized in the Subletting and Subcontracting Fair Practices Act. Subletting or subcontracting of any portion of the work in excess of one-half of one percent of the contractor's total bid as to which no subcontractor was designated in the original bid shall only be permitted in cases of public emergency or necessity, and then only after a finding reduced to writing as a public record of the authority awarding this Contract setting forth the facts constituting the emergency or necessity.

Portion of Work	Subcontractor	Location of Business	Phone Number	License No. and Exp. Date

Portion of Work	Subcontractor	Location of Business	Phone Number	License No. and Exp. Date

Proper Name of Bidder _____ Address _____

By (Print Name) _____ Title _____

Phone _____ Date _____

END OF DOCUMENT 00 43 36

**SECTION 00 4513
BIDDER'S QUALIFICATIONS**

INFORMATION REQUIRED OF BIDDERS
COUNTY OF MADERA
200 West 4th Street, Madera CA 93637

Bidder references and responsibility information

1. The County expressly reserves the right to reject the bid of any bidder who, upon investigation, has been determined to fail to complete similar contracts in a timely fashion or in a satisfactory manner. Such rejection would, if applicable, be based upon the principle that the bidder is "non-responsible" and poses a substantial risk of being unable to complete the work in a cost-effective, professional, and timely manner.
2. In performing the above-described responsibility determination, the County reserves the right to utilize all possible sources of information in making its determination, including but not limited to inquiries to regulatory State Boards and agencies; Dun and Bradstreet credit reports, inquiries to companies and public entities for which the contractor has previously performed work, reference checks and examination of all public records.
3. The bidder must provide the following information:

- a. Firm Name and Address:

- b. Telephone: _____

- c. Type of Firm: Individual _____
(Check one) Partnership _____
Corporation _____

- d. Contractor's License: Primary Class _____ Lic. No. _____
License Expiration Date: _____

- e. Names and titles of all officers of the firm:

- f. Number of years as a contractor in construction of this type: _____

4. The bidder must also demonstrate knowledge of public construction techniques and should possess a working ability to perform similarly sized construction work for a public agency. This knowledge and ability shall be shown by furnishing the names, current phone numbers, and address, points of contract and scope of work of at least five (5) customers served within the past three (3) years with requirements similar to the needs of the County of Madera.

- a. FAILURE TO FURNISH THE REFERENCES (IN THE COMPLETE FORMAT REQUIRED) MAY CAUSE YOUR BID TO BE REJECTED AS NONRESPONSIVE.

EXAMPLE: Your references should be listed in the following format (facts are example only)

- i. Work for X Y Z County
- ii. Phone # (222) 123-4567
- iii. 999 Holly Drive, L.A., CA 92000
- iv. Contact: J.Q. Jones III at above #
- v. Renovated Hills High in 1990 for \$1.3 Million.

Bidder's Name:	
<u>Reference #1</u>	
County or Entity:	
Phone #:	
Address:	
Name of Contact:	
Scope of Work & \$ Amount:	

Bidder's Name:	
<u>Reference #2</u>	
County or Entity:	
Phone #:	
Address:	
Name of Contact:	
Scope of Work & \$ Amount:	

Bidder's Name:	
<u>Reference #3</u>	
County or Entity:	
Phone #:	
Address:	
Name of Contact:	

Scope of Work & \$ Amount:	

Bidder's Name:	
<u>Reference #4</u>	
County or Entity:	
Phone #:	
Address:	
Name of Contact:	
Scope of Work & \$ Amount:	

Bidder's Name:	
<u>Reference #5</u>	
County or Entity:	
Phone #:	
Address:	
Name of Contact:	
Scope of Work & \$ Amount:	

END OF DOCUMENT 00 45 13

State of California)
) ss.
County of _____)

00 45 19 – 1 of 1

**SECTION 00 4526
CONTRACTOR'S CERTIFICATE REGARDING
WORKERS' COMPENSATION**

Labor Code Section 3700 in relevant part provides:

Every employer except the State shall secure the payment of compensation in one or more of the following ways:

- (a) By being insured against liability to pay compensation in one or more insurers duly authorized to write compensation insurance in this State.
- (b) By securing from the Director of Industrial Relations a certificate of consent to self-insure, which may be given upon furnishing proof satisfactory to the Director of Industrial Relations of ability to self-insure and to pay any compensation that may become due to his employees

I am aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this Contract.

Contractor

By _____
Signature

Title _____

(In accordance with Article 5 (commencing at Section 1860), chapter 1, part 7, division 2 of the Labor Code, the above certificate must be signed and filed with the awarding body prior to performing any work under this Contract.)

END OF DOCUMENT 00 45 26

MADERA COUNTY CONTRACT NO. _____
(Madera County Riverstone Fire Station)

THIS AGREEMENT is made and entered into this _____ day of _____, 2026, by and between the COUNTY OF MADERA, a political subdivision of the State of California ("COUNTY"), and _____, a California corporation ("CONTRACTOR").

AGREEMENT

1. **TERM.** CONTRACTOR's services under this Agreement shall be commenced on the date stated in the County's Notice to Proceed be completed by/within _____. In entering into this Contract, Contractor acknowledges and agrees that the construction duration stipulated herein is adequate and reasonable for the size and scope of the Project.
2. **SCOPE OF SERVICES.** CONTRACTOR's scope of services under this Agreement shall be as set forth perform in CONTRACTOR's Bid Form dated _____, and Request for Proposal (RFP) # _____, copies of which are attached hereto as Exhibits "A" and "B" and incorporated herein by reference.
3. **INCORPORATION OF MASTER AGREEMENT.** Madera County Master Contract No. 011 is incorporated herein by reference as if fully stated. CONTRACTOR shall adhere to all terms and conditions of Master Contract No. 011.
4. **COMPENSATION AND COSTS.** CONTRACTOR's total compensation for the satisfactory completion of services under this Agreement shall be the sum of _____ (\$_____).
5. **NOTICES.** All notices required by this Agreement shall be in writing and shall be effective upon personal service or deposit in the mail, postage prepaid and addressed as follows:

COUNTY

Joel Bugay
Madera County General Services
200 West Fourth Street
Madera, CA 93637

CONTRACTOR

Contractors Name
Company Name
Street
City, State, zip code

COPY TO:

Karen Scrivner, Clerk of the Board
Madera County Board of Supervisors
200 West Fourth Street
Madera, CA 93637

6. **INSURANCE.** CONTRACTOR shall not commence work under this Agreement until first obtaining general liability insurance in the amount of One Million Dollars (\$1,000,000.00) per occurrence and Two Million Dollars (\$2,000,000.00) aggregate; automotive insurance in the amount of One Million Dollar (\$1,000,000.00) per occurrence, combined single limits, including bodily injury and property damage; and workers' compensation insurance as required by California law. General liability policies shall name the County of Madera, its officers, employees, agents, and volunteers as additional insureds.

7. **BONDS.** CONTRACTOR shall comply with Section 33 of Madera County Master Agreement, contract Number 011.

8. **LIQUIDATED DAMAGES.** Liquidated Damages in the daily amount of two thousand dollars (\$2,000.00) per day shall apply pursuant to Section 35 of Madera County Master Agreement, Contract Number 011, and as provided in the General Conditions and Special Conditions.

9. **PREVAILING WAGES.** Contractor shall comply with the prevailing wage provisions of the Labor Code and the prevailing wage rate determinations of the Department of Industrial Relations. These rates are posted on the State of California Department of Industrial Relations website at www.dir.ca.gov. Copies may be obtained on request. A copy of these rates shall be posted at the job site. It shall be mandatory upon the Contractor and all subcontractors to comply with all Labor Code provisions, which include but are not limited to prevailing wages, employment of apprentices, hours of labor, and debarment of Contractors and subcontractors.

10. **DEPARTMENT OF INDUSTRIAL RELATIONS COMPLIANCE.** Contractor and any subcontractors shall be registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5. This Contract is subject to compliance monitoring and enforcement by the Department of Industrial Relations. Contractors must furnish electronic certified payroll records to the Labor Commissioner in the eCPR data system, or equivalent as authorized by the Labor Commissioner.

11. **COMPONENT PARTS OF THE CONTRACT.** The agreement entered into by this Contract consists of the following Contract Documents, all of which are component parts of the Contract as if herein set out in full or attached hereto:

Advertisement for Bids
Instructions to Bidders
Request for Clarification Form
Bid Form
Proposed Subcontractors Form
Bidder Qualification Form
Non-Collusion Affidavit
Contractor's Certification Regarding Workers Compensation
Contract
Bid Bond
Performance Bond
Payment Bond for Public Works
General Conditions
Supplementary Conditions
Insurance Policies
Addenda No. _____, _____, _____, _____, _____, as issued
Drawings, Plans, and Specifications.

All of the above-named Contract Documents are intended to be complementary. Work required by one of the above-named Contract Documents and not by others shall be done as if required by all. This Contract shall supersede any prior agreement of the parties.

//

* * * * *

IN WITNESS WHEREOF the foregoing Agreement is executed on the date and year first above-written.

COUNTY OF MADERA

ATTEST:

Clerk, Board of Supervisors

Chairman, Board of Supervisors

Approved as to Legal Form:
COUNTY COUNSEL

CONTRACTOR NAME

By:_____

By:_____
Signature

Print Name

ACCOUNT NUMBER(S)

END OF DOCUMENT 00 52 13

**SECTION 00 61 00
BID BOND**

KNOW ALL MEN BY THESE PRESENTS: That we,

_____,
as Principal, and _____,
as Surety, are held and firmly bound unto the Madera County, hereinafter called the County, in the penal sum
_____ PERCENT (_____%) OF THE TOTAL AMOUNT OF THE BID of the
Principal submitted to the said COUNTY for the work described below for the payment of which sum in lawful
money of the United States, well and truly to be made, we bind ourselves, our heirs, executors, administrators,
successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that whereas the Principal has submitted the accompanying
bid dated _____, 20____, for _____.

NOW, THEREFORE. If the Principal shall not withdraw said bid within the period specified therein after the
opening of the same, or, if no period be specified, within sixty (60) days after said opening; and, if the Principal
be awarded the contract, and shall within the period specified therefore, or if no period be specified, within ten
(10) consecutive calendar days after the notification of Award of Contract complete the prescribed forms are
presented to him for signature enter into a written contract with the County in accordance with the bid as
accepted and give bond with good and sufficient surety or sureties, as may be required, for the faithful
performance and proper fulfillment of such contract and for the payment for labor and materials used for the
performance of the contract, or in the event of the withdrawal of said bid within the period specified or the failure
to enter into such contract and give such bonds within the time specified. If the Principal shall pay the County
the difference between the amount specified in said bid and the amount for which the County may procure the
required work and/or supplies, if the latter amount be in excess of the former, together with all costs incurred by
the County in again calling for bids, then the above obligation shall be void and of no effect, otherwise to remain
In full force and virtue.

Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition
to the terms of the contract on the call for bids, or to the work to be performed thereunder, or the specifications
accompanying the same, shall in anywise affect its obligation under this bond, and It does hereby waive notice
of any such change, extension of time, alteration or addition to the terms of said contract or the call for bids, or
to the work, or to the specifications.

In the event a lawsuit is brought upon this bond by the County and judgment is recovered, the surety shall pay
all litigation expenses incurred by the County in such suit, including reasonable attorneys' fees, court costs,
expert witness fees and investigation expenses.

IN WITNESS WHEREOF, the above-bound parties have executed this instrument under their several seals this
_____ day of _____, 20____, the name and corporate seal of each corporate party being hereto
affixed, and these presents duly assigned by its undersigned representative, pursuant to authority of Its
governing body.

(Corporate Seal)

Principal

By _____

Title: _____

(Corporate Seal)

Surety

By _____
Attorney-in-Fact

(Attach Attorney-in-Fact Certificate)

Title _____

END OF DOCUMENT 00 61 00

**SECTION 00 61 13.13
PERFORMANCE BOND**

KNOW ALL MEN BY THESE PRESENTS That

WHEREAS, the County of Madera (hereinafter designated as "Public Entity"), by action taken or a resolution passed, _____ 20____ has awarded to _____ hereinafter designated as the "Principal," a contract for work described as follows:

(the "Project"); and _____ (Contractor to Insert Project Title and Project #)
WHEREAS, said Principal is required under the terms of said contract to furnish a bond for the faithful performance of thereof;

NOW THEREFORE, we, the Principal and _____, as Surety, are held and firmly bound unto the Public Entity in the penal sum of _____ Dollars (\$_____) which is one hundred percent (100%) of the total contract amount for the above stated Project. lawful money of the United States of America, to be paid to the County for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that if the above bounded Principal, his or its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by and well and truly keep and perform, the covenants, conditions, and agreements in the said contract and any alteration thereof made as therein provided, on his or their part, to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify and save harmless the County, its officers and agents, as therein stipulated, then this obligation shall become null and void, otherwise, It shall be and remain in full force and virtue. And the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contractor to the work to be performed thereunder, or the specifications accompanying the same, shall in anywise affect its obligation on this bond, it does hereby waive notice of any such change, extension of time, alteration, or addition to the terms of the contract, or to the work, or to the specifications. In the event suit is brought upon this bond by the County and judgment is recovered, the Surety shall pay all litigation expenses incurred by the County in such suit, including attorneys' fees, court costs, expert witness fees and investigation expenses.

IN WITNESS WHEREOF, two (2) identical counterparts of this instrument, each of which shall for all purposes be deemed an original thereof, have been duly executed by the Principal and Surety above named, on the day of _____, 20____, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative pursuant to authority of its governing body.

IN WITNESS WHEREOF, we have here to set our hands and seals this _____ day on _____, 20____.

(Corporate Seal of Principal if corporation)

Principal (Property Name of Contractor)

By _____

(Signature of Contractor)

(Seal of Surety)

Surety

By _____

Attorney in Fact

(Attached Attorney-in Fact Certificate and Required Acknowledgements)

*Note: Appropriate Notarial Acknowledgments of Execution by Contractor and surety and a power of Attorney MUST BE ATTACHED.

END OF DOCUMENT 00 61 13.13

SECTION 00 61 13.16
PAYMENT BOND FOR PUBLIC WORKS

KNOW ALL MEN BY THESE PRESENTS That

WHEREAS, the County of Madera (hereinafter designated as the "County"), by action taken or a resolution passed _____, 20____ has awarded to _____ hereinafter designated as the "Principal," a contract for the work described as follows:

(the "Project"); and _____. (Contractor to Insert Project Title and Project #) WHEREAS, said Principal is required to furnish a bond in connection with said contract; providing that if said Principal or any of its Subcontractors shall fail to pay for any materials, provisions, provender, equipment, or other supplies used in, upon, for or about the performance of the work contracted to be done, or for any work or labor done thereon of any kind, or for amounts due under the Unemployment Insurance Code or for any amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of said Principal and its Subcontractors with respect to such work or labor the Surety on this bond will pay for the same to the extent hereinafter set forth.

NOW THEREFORE, we, the Principal and _____ as Surety, are held and firmly bound unto the County in the penal sum of _____ Dollars (\$_____) lawful money of the United States of America, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that if said Principal, his or its subcontractors, heirs, executors, administrators, successors or assigns, shall fail to pay any of the persons named in Section 3181 of the Civil Code, fail to pay for any materials, provisions or other supplies, 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 amounts due under the Unemployment Insurance Code with respect to work or labor performed under the contract, or for any amounts required to be deducted, withheld, and paid over to the Employment Development Department or Franchise Tax Board from the wages of employees of the contractor and his subcontractors pursuant to section 18663 of the Revenue and Taxation Code, with respect to such work and labor the surety or sureties will pay for the same, in an amount not exceeding the sum herein above specified, and also, in case suit is brought upon this bond, all litigation expenses incurred by the Public Entity in such suit, including reasonable attorneys' fees, court costs, expert witness fees and investigation expenses.

This bond shall inure to the benefit of any of the persons named in Section 3181 of the Civil Code so as to give a right of action to such persons or their assigns in any suit brought upon this bond.

It is further stipulated and agreed that the Surety on this bond shall not be exonerated or released from the obligation of this bond by any change, extension of time for performance, addition, alteration or modification in, to, or of any contract, plans, specifications, or agreement pertaining or relating to any scheme or work of improvement herein above described, or pertaining or relating to the furnishing of labor, materials, or equipment therefore, nor by any change or modification of any terms of payment or extension of the time for any payment pertaining or relating to any scheme or work of improvement herein above described, nor by any rescission or attempted rescission or attempted rescission of the contract, agreement or bond, nor by any conditions precedent or subsequent in the bond attempting to limit the right of recovery of claimants otherwise entitled to recover under any such contract or agreement or under the bond, nor by any fraud practiced by any person other than the claimant seeking to recover on the bond and that this bond be construed most strongly against the Surety and in favor of all persons for whose benefit such bond is given, and under no circumstances shall Surety be released from liability to those for whose benefit such bond has been given, by reason of any breach

of contract between the owner or Public Entity and original contractor or on the part of any obligee named in such bond, but the sole conditions of recovery shall be that claimant is a person described in Section 3110 or 3112 of the Civil Code, and has not been paid the full amount of his claim and that Surety does hereby waive notice of any such change, extension of time, addition, alteration or modification herein mentioned.

IN WITNESS WHEREOF, two (2) identical counterparts of this instrument, each of which shall for all purposes be deemed unoriginal thereof, have been duly executed by the Principal and Surety above named, on the ____ day of _____, 20____ the name and corporate seal of each corporate party being hereto affixed and these IN WITNESS WHEREOF, we have here to set our hands and seals this ____ day on _____, 20____

(Corporate Seal of Principal if corporation) _____

Principal (Property Name of Contractor)

By _____

(Signature of Contractor)

(Seal of Surety)

Surety

By _____

Attorney in Fact

(Attached Attorney-in Fact Certificate and
Required Acknowledgements)

*Note: Appropriate Notarial Acknowledgments of Execution by Contractor and surety and a power of Attorney MUST BE ATTACHED.

SECTION 00 72 13 - GENERAL CONDITIONS

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ARTICLE 1. DEFINITIONS

- a. Acceptable, Acceptance or words of similar import are used, it shall be understood that the acceptance of the Construction Manager, Architect and/or the County is intended.
- b. Approval means written authorization by Construction Manager, Architect and/or County for specific applications within the Contract.
- c. Architect means the Architect employed by County to provide architecture and related services for the Project.
- d. Construction Manager means the Construction Manager employed by the County to provide construction management and related services for the Project.
- e. Contract, Contract Documents include all Contract Documents including: Advertisement for Bids, Instructions to Bidders, Bid Form, Proposed Subcontractors Form, Proposed Construction Schedule Form, Bidder's Qualifications, Non-Collusion Affidavit, Certificate Regarding Workers' Compensation, Performance Bond, Payment Bond for Public Works, Insurance Policies Documents, General Conditions, Supplementary Conditions, if any, Drawings, Plans, Specifications, the Contract, and all modifications, addenda, and amendments.
- f. Day as used herein shall mean calendar day unless otherwise specifically designated.
- g. County and Contractor are those mentioned as such in the Contract. For convenience and brevity, these terms, as well as terms identifying other persons involved in the Contract are treated throughout the Contract Documents as if they are of singular number and masculine gender. The Terms County and Owner are used interchangeably.
- h. County's Representative or Representative means any representative of the County authorized in writing to act on behalf of the County, including but not limited to the County's Architect, Inspector and/or Construction Manager.
- i. Equal, Equivalent, Satisfactory, Directed, Designated, Selected, As Required and words of similar meaning are used, the written approval, selection, satisfaction, direction, or similar action of the Construction Manager, Architect, and/or County is required.
- j. Includes and Including do not limit the work to the items following those words.
- k. Indicated, Shown, Detailed, Noted, Scheduled or words of similar meaning shall mean that reference is made to the drawings, unless otherwise noted. It shall be understood that the direction, designation, selection, or similar import of the Construction Manager, Architect, and/or County is intended, unless stated otherwise.
- l. Locality in which the work is performed means the county in which the public work is done.
- m. Perform shall be understood to mean that the Contractor, at Contractor's expense, shall perform all operations necessary to complete the work, including furnishing of necessary labor, tools, and equipment, and further including the furnishing and installing of materials that are indicated, specified, or required to complete such performance.
- n. Project is the undertaking planned by County and Contractor as provided in the Contract Documents.
- o. Provide shall include "provide complete in place," that is, "furnish, install, test and make ready for use."
- p. Required and words of similar meaning are used, it shall mean "as required to properly complete the work" as required by the Construction Manager, Architect and/or County, unless stated otherwise.
- q. Subcontractor as used herein, includes those having a direct contract with Contractor and one who furnishes material worked to a special design according to plans, drawings, and specifications of this work, but does not include one who merely furnishes material not so worked.
- r. Surety is the person, firm, or corporation, admitted as a California admitted surety, that executes as surety the Contractor's Performance Bond and Payment Bond for Public Works. Surety must be an admitted surety insurer pursuant to Code of Civil Procedure Section 995.120.
- s. The Work means the entire improvement proposed by the County to be constructed in whole, or in part, pursuant to the Contract Documents.
- t. Work means labor, equipment and materials incorporated in, or to be incorporated in the construction covered by the Contract Documents.
- u. Worker includes laborer, worker, or mechanic, and any supervisors thereto.

ARTICLE 2. DRAWINGS AND SPECIFICATIONS

- a. **Contract Documents.** Contract Documents are complementary, and what is called for by one shall be as binding as if called for by all. The intention of documents is to provide the County with complete and fully operational facilities as indicated and specified including all labor and materials, equipment, and transportation necessary for the proper execution of the work. Materials or work described in words which as applied have a well-known technical or trade meaning shall be deemed to refer to such recognized standards.
- b. **Interpretations.** Drawings and specifications are intended to be fully cooperative and to agree. However, if Contractor observes that drawings and specifications are in conflict, the Contractor shall promptly notify the Construction Manager in writing and any necessary changes shall be adjusted as provided in contracts for changes in work. If such conflict arises, the following order of precedence shall generally apply, provided, however, that the order of precedence shall not be so rigidly interpreted as to affect an absurd or costly result:
 - 1) Supplementary Conditions shall take precedence over General Conditions.
 - 2) Technical Specifications implement, in additional detail, the requirements of the General Conditions. In the event of conflict between the Technical Specifications and the General Conditions, the General Conditions shall take precedence.
 - 3) In the event of a conflict between the Technical Specifications and the drawings, the higher quality, higher quantity and the most stringent requirements shall be deemed to apply and shall govern as to materials, workmanship, and installation procedures.
 - 4) With regard to drawings:
 - (a) Figures govern over scaled dimensions;
 - (b) Larger scale drawings and details govern over smaller scale drawings;
 - (c) Addenda/change order drawings govern over Contract drawings;
 - (d) Contract drawings govern over standard drawings.
 - 5) Work not particularly shown or specified shall be the same as similar parts that are shown or specified.
- c. Misunderstanding of drawings and specifications shall be clarified by the Architect, whose decisions shall be final, and which shall be communicated to the Contractor by the Construction Manager.
- d. Standards, Rules, and Regulations referred to are recognized printed standards and shall be considered as one and a part of these specifications within limits specified.
- e. **Compliance with Applicable Laws.** Drawings and specifications are intended to comply with all laws, ordinances, rules, and regulations of authorities having jurisdiction, and where referred to in the Contract Documents, said laws, ordinances, rules, and regulations shall be considered as part of said Contract Documents within the limits specified. The Contractor shall bear all expenses correcting work done contrary to said laws, ordinances, rules, and regulations and if the Contractor (1) performed same without first consulting the Construction Manager for securing the Architect's instructions regarding said work or (2) disregarded the Architect's instructions regarding said work.
- f. **Provisions of Law Deemed Inserted.** Each and every provision of law required by law to be inserted in this Contract shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein, and if through mistake, omission or otherwise any such provision is not inserted, or is not correctly inserted, then upon application of either party the Contract shall be amended in writing to make such insertion or correction.
- g. **County's Authority.** The County retains the authority to issue the ultimate decision in the event the Construction Manager and Architect cannot reach a consensus regarding any clarification requested, any necessary changes to conflicting drawings and specifications, any requested instructions or any similar issue presented under this Article 2.
- h. **Organization of Work.** Organization of the specification into divisions, sections, and articles, and arrangement of drawings shall not control the Contractor in dividing the work among subcontractors or in establishing the extent of work to be performed by any trade.

ARTICLE 3. COPIES FURNISHED

Contractor will be furnished, free of charge, five copies of drawings and specifications as set forth in the Supplementary Conditions. Additional copies may be obtained at cost of reproduction.

ARTICLE 4. OWNERSHIP OF DRAWING

All drawings, specifications, and copies thereof furnished by the County are County property. They are not to be used by Contractor or Subcontractor on other work nor shall Contractor claim any right to such documents. With exception of one signed Contract set, all documents shall be returned to the County on request at completion of work.

ARTICLE 5. DETAIL DRAWINGS AND INSTRUCTIONS

- a. **Examination of Drawings and Specifications.** Before commencing any portion of the Work, Contractor shall carefully examine all Drawings and Specifications and other information given to Contractor as to materials and methods of construction and other Project requirements. Contractor shall immediately notify County and both the Construction Manager and Architect of any perceived or alleged error, inconsistency, ambiguity, or lack of detail or explanation in the Drawings and Specifications in the manner provided herein. If the Contractor or its Subcontractors, material or equipment suppliers, or any of their officers, agents and employees performs, permits, or causes the performance of any Work under the Contract Documents which it knows or should have known to be in error, inconsistent, or ambiguous, or not sufficiently detailed or explained, Contractor shall bear any and all costs arising therefrom including, without limitation, the cost of correction thereof without increase or adjustment to the Contract Price, as set forth in Article 3 of the Contract, or the time for performance. If Contractor performs, permits, or causes the performance of any Work under the Contract Documents prepared by or on behalf of Contractor which is in error, inconsistent or ambiguous, or not sufficiently detailed or explained, Contractor shall bear any and all resulting costs, including, without limitation, the cost of correction, without increase to or adjustment in the Contract Price or the time for performance. In no case shall any Subcontractor proceed with the Work if uncertain without the Contractor's written direction and/or approval.
- b. **Additional Instructions.** Within **ten (10) calendar days** of notification of any ambiguity, conflict or lack of information, the Construction Manager will provide Architect's prepared additional instructions, by means of drawings or other written direction, necessary for proper execution of work. All such drawings and instruments shall be consistent with the Contract Documents, true developments thereof, and reasonable inferable therefrom. Work shall be executed in conformity therewith and Contractor shall do no work without proper drawings and instructions. Any necessary additional details furnished by the Construction Manager and/or the Architect to more fully explain the work shall be considered as part of the Contract Documents.
- c. **Scale Drawings.** Should any details need to be more elaborate, in the opinion of the Contractor, than scale drawings and specifications warrant, written notice thereof shall be given to the Construction Manager within five (5) working days of the receipt of same. In case no notice is given to the Construction Manager within five (5) working days, it will be assumed the details are a reasonable development of the scale drawings. In case notice is given, then the Construction Manager and Architect, together, will consider the claim and if found justified, the drawings will be modified by the Architect, or Construction Manager shall recommend to the County a change order for the extra work involved within a reasonable amount of time.
- d. **Quality of Parts, Construction and Finish.** All parts of the described and shown construction shall be of the best quality of their respective kinds and the Contractor is hereby advised to use all diligence to inform himself fully as to the required construction and finish, and in no case to proceed with the different parts of the work without obtaining first from both the Construction Manager and Architect such directions and/or drawings as may be necessary for the proper performance of the work.
- e. **Contractor's Variation from Contract Document Requirements.** If it is found that the Contractor has varied from the drawings and/or specifications, in materials, quality, form or finish, or in the amount or value of the materials and labor used, the Construction Manager, shall be at liberty at any time, before or after completion of the work, to order such improper work removed, remade and replaced, and all work disturbed by these changes shall be made good at the Contractor's expense, or the Construction Manager, after consultation with the Architect, shall receive from the Contractor, for the County (or County shall deduct from amount due Contractor), a sum of money equivalent to the difference in value between the work performed and that called for by the drawings and specifications, it being optional with the Construction Manager and Architect to pursue either course.

ARTICLE 6. TIME FOR COMPLETION AND LIQUIDATED DAMAGES

- a. **Time for Completion/Liquidated Damages.** Work shall be commenced on or before the date stated in the County's notice to the Contractor to proceed and shall be completed by Contractor in the time specified in the Supplementary Conditions. The County is under no obligation to consider early completion of the Project and the Contract completion date shall not be amended by the County's acceptance of the Contractor's proposed earlier completion date. Furthermore, Contractor shall not, under any circumstances receive additional compensation from the County for indirect, general, administrative or other forms of overhead costs for the period between the time of earlier completion proposed by the Contractor and the official

Contract completion date. If the work is not completed in accordance with the foregoing, it is understood that the County will suffer damage. It being impractical and infeasible to determine the amount of actual damage, it is agreed that Contractor shall pay to the County as fixed and liquidated damages, and not as a penalty, the sum stipulated in the Supplementary Conditions for each calendar day of delay until work is completed and accepted. Contractor and his surety shall be liable for the amount thereof. Any money due or to become due the Contractor may be retained to cover said liquidated damages. Should such money not be sufficient to cover said liquidated damages, the County shall have the right to recover the balance from the Contractor or his sureties, who will pay said balance forthwith. Regardless of the schedule submitted by Contractor, no delay claims shall be accepted by the County unless the event or occurrence delays the completion of the Project beyond the contractual completion date.

- b. **Inclement Weather.** Contractor shall abide by Construction Manager's determination of what constitutes inclement weather based upon the Inspector or geotechnical engineer's recommendation. A bad weather day is a day when the weather causes unsafe work conditions or is unsuitable for work that should not be performed during inclement weather (i.e., exterior finishes), and shall include consideration when rain days exceed the normal frequency and amount based on the closest weather station data averaged over the past three years, for the period of this Contract and when Contractor can show that such rain days impact the critical path. Time extensions shall only be granted when the work that is stopped during inclement weather is on the critical path of the Project schedule. Contractor shall be expected to perform all work he can possibly complete during inclement weather (i.e., interior work),
- c. **Extension of Time.** Contractor shall not be charged liquidated damages because of any delays in completion of work due to unforeseeable causes beyond the control and without the fault or negligence of Contractor including, but not restricted to: acts of God, or of public enemy, acts of Government, acts of County or anyone employed by him or acts of another Contractor in performance of a contract with the County, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and unusually severe weather or delays of subcontractors due to such causes. Contractor shall within five (5) calendar days of the beginning of any such delay (unless the County grants a further period of time prior to date of final settlement of the Contract) notify the County in writing of causes of delay; thereupon the County shall ascertain the facts and extent of delay and grant extension of time for completing work when, in its judgment, the findings of fact justify such an extension. The County's findings of fact thereon shall be final and conclusive on parties hereto. In case of a continuing cause of delay, only one claim is necessary. Time extensions to the Project should be requested by the Contractor as they occur and without delay. Regardless of the schedule submitted by Contractor, no delay claims shall be accepted by the County unless the event or occurrence delays the completion of the Project beyond the contractual completion date.
- d. **No Damages for Delay.** the County's liability to Contractor for delays for which the County is responsible shall be limited to an extension of time for delays unless such delays were unreasonable under the circumstances involved and were not within the contemplation of the parties when the Contract was awarded. Contractor agrees that the Construction Manager shall determine the actual costs to Contractor of any delay for which Contractor may claim damages from the County. Such costs, if any, shall be directly related to the Project, and shall not include costs that would be borne by the Contractor in the regular course of business, including, but not limited to, home office overhead and ongoing insurance costs. The County shall not be liable for any damages which the Contractor could have avoided by any reasonable means including, but not limited to, the judicious handling of forces, equipment, or plant.

ARTICLE 7. REMOVAL OR RELOCATION OF MAIN OR TRUNKLINE UTILITY FACILITIES

- a. The County has endeavored to determine the existence of utilities at the site of the work from the records of the owners of known utilities in the vicinity of the work. The positions of these utilities as derived from such records are shown on the plans.
- b. No excavations were made to verify the locations shown for underground utilities. The service connections to these utilities are not shown on the plans. It shall be the responsibility of the Contractor to determine the exact location of all service connections. The Contractor shall make his own investigations, including exploratory excavations, to determine the locations and type of service connections, prior to commencing work which could result in damage to such utilities. The Contractor shall immediately notify the County's Representative as to any utility discovered by him in a different position than shown on the plans or which is not shown on the plans.

1) MAIN OR TRUNKLINE FACILITIES

- (a) Notwithstanding the above, pursuant to Section 4215 of the Government Code, as it may be amended from time to time, the County has the responsibility to identify, with reasonable accuracy, main or trunk line facilities on the plans and specifications. In the event that main or trunk line utility facilities are not identified with reasonable accuracy in the plans and specifications made a part of the invitation for bids, County shall assume the responsibility for their timely removal, relocation, or protection.

- (b) The Contractor shall be compensated by the County for the costs of locating and repairing damage not due to the failure of the Contractor to exercise reasonable care, and removing, relocating, protecting or temporarily maintaining such main or trunk line utility facilities not indicated with reasonable accuracy in the plans and specifications, and for equipment in the Project necessarily idled during such work. In this regard, Contractor will be required to do such work in accordance with Article 48 herein.
- (c) Alternatively, County may make changes in the alignment and grade of the work to obviate the necessity to remove, relocate, or temporarily maintain the utility, in accordance with Article 48 or County may make arrangements with the owner of the utility for such work to be done at no cost to the Contractor.
- (d) The Contractor shall not be assessed a forfeiture for delay in completion of the Project when such delay is caused by the failure of the County or the owner of the utility to provide for the removal, relocation, protection, or temporary maintenance of all such main or trunk line facilities not indicated with reasonable accuracy.
- (e) Nothing herein shall preclude the County from pursuing any appropriate remedy against the utility for delays which are the responsibility of the utility.
- (f) Nothing herein shall be construed to relieve the utility from any obligation as required either by law or by contract to pay the cost of removal or relocation of existing utility facilities.
- (g) If the Contractor while performing the Contract discovers utility facilities not identified by the County in the Contract plans or specifications, he shall immediately notify the County and utility in writing.
- (h) The owner of the public utility shall have the sole discretion to perform repairs or relocation work or hire the Contractor to do such repairs or relocation work at a reasonable price.

2) OTHER UTILITIES

- (a) In case it should be necessary to remove, relocate, or temporarily maintain a utility because of interference with the work, the work on the utility shall be performed and paid for as follows:
 - i. When it is necessary to remove, relocate or temporarily maintain a service connection, the cost of which is not required to be borne by the owner thereof, the Contractor shall bear all expenses incidental to the work on the service connection. The work on the service connection shall be done in a manner satisfactory to the owner thereof; it being understood that the owner of the service connection has the option of doing such work with his own forces or permitting the work to be done by the Contractor.
 - ii. When it is necessary to remove, relocate, or temporarily maintain a utility which is in the position shown on the plans, the cost of which is not required to be borne by the owner thereof, the Contractor shall bear all expenses incidental to the work on the utility. The work on the utility shall be done in a manner satisfactory to the owner thereof; it being understood that the owner of the utility has the option of doing such work with his own forces or permitting the work to be done by the Contractor.
 - iii. When it is necessary to remove, relocate, or temporarily maintain a utility which is not shown on the plans or is in a position different from that shown on the plans and were it in the position shown on the plans would not need to be removed, relocated, or temporarily maintained, and the cost of which is not required to be borne by the owner thereof, the County will make arrangements with the owner of the utility for such work to be done at no cost to the Contractor, or will require the Contractor to do such work in accordance with Article 48 or will make changes in the alignment and grade of the work to obviate the necessity to remove, relocate, or temporarily maintain the utility. Changes in alignment and grade will be ordered in accordance with Article 48 herein.
 - iv. No representations are made that the obligations to move or temporarily maintain any utility and to pay the cost thereof is or is not required to be borne by the owner of such utility, and it shall be the responsibility of the Contractor to investigate to find out whether or not said cost is required to be borne by the owner of the utility.
 - v. The right is reserved to governmental agencies and to owners of utilities to enter at any time upon any street, alley, right-of-way, or easement for the purpose of making

changes in their property made necessary by the work and for the purpose of maintaining and making repairs to their property.

ARTICLE 8. PROGRESS SCHEDULE

- a. **Estimated Schedule.** Within **fourteen (14) calendar days** after the effective date of the Notice to Proceed, Contractor shall prepare an estimated progress schedule and shall submit same to County Construction Manager for approval. The schedule shall clearly identify all staffing and other resources which in the Contractor's judgment are needed to complete the Project within the time specified for completion. The schedule shall include milestones and shall include the "critical path" of construction. Such schedule shall be submitted to County, Construction Manager and Architect for the County's approval. The Contractor is fully responsible to determine and provide for any and all staffing and resources at levels which allow for good quality and timely completion of the Project; the County's approval of the progress schedule does not relieve the Contractor of any such responsibility. Contractor's failure to incorporate all elements of work required for the performance of the Contract or any inaccuracy in the schedule shall not excuse the Contractor from performing all work required for a completed Project within the specified Contract time period, notwithstanding the County's acceptance of the schedule. If the required schedule is not received by the time the first payment request is due, Contractor shall not be paid until the schedule is received, reviewed, and accepted by the County.
- b. **Schedule Contents.** The schedule shall allow enough time for inclement weather. Such schedule shall indicate graphically the beginning and completion dates of all phases of construction, shall indicate the critical path for all critical, sequential time related activities. All required schedules shall indicate "float time" for all "slack" or "gaps" in the non-critical activities. Submitted construction schedules shall have duration to match the Contract time. Excess time may be picked up with "float time" if needed or desired by the Contractor. A "bar chart" in reasonably complete detail shall be adequate in contracts over \$1 million and shall show critical path items. All required schedules shall be periodically updated to reflect changes in the status of the job, including weather delays. At a minimum, the Contractor shall be required to provide and keep updated a monthly schedule in order to prevent delay claims.
- c. **State Testing.** In no event shall Contractor conduct any work on the Project on dates on which State Testing of Pupils is conducted. County or County's Representative will provide Contractor with a schedule of test dates concurrent with the County's issuance of notice of award of Contract, or as soon as such test dates are made available to the County.

ARTICLE 9. CONTRACT SECURITY

Unless otherwise specified in Supplementary Conditions, Contractor shall furnish a surety bond in an amount equal to one hundred percent (100%) of Contract Price as security for faithful performance of this Contract and shall furnish a separate bond in an amount at least equal to one hundred percent (100%) of the Contract Price as security for payment of persons performing labor and furnishing materials in connection with this Contract. Both the Payment and Performance Bonds must be executed by an admitted Surety, as defined in Code of Civil Procedure Section 995.120. The Payment and Performance Bonds must be accompanied by the original or a certified copy of the unrevoked power of attorney or other appropriate instrument entitling or authorizing the person who executed the bond to do so. In addition, to the extent required by law, the Payment and Performance Bonds must be accompanied by a certified copy of the certificate of authority of the insurer issued by the Insurance Commissioner of the State of California, a certificate from the Clerk of the County of Madera that the certificate of authority of the insurer has not been surrendered, revoked, cancelled, annulled, or suspended, or if it has that it has been renewed, and four copies of the insurer's most recent annual statement and quarterly statement filed with the Department of Insurance of the State of California. Aforesaid bonds shall be in form set forth in these Contract Documents. Upon request of Contractor, the County will consider and accepting multiple sureties on such bonds.

ARTICLE 10. ASSIGNMENT

Contractor shall not assign, transfer, convey, sublet, or otherwise dispose of this Contract or any part thereof including any claims, without prior written consent of the County. Any assignment without the written consent of the County shall be void. Any assignment of money due or to become due under this Contract shall be subject to a prior lien for services rendered or material supplied for performance of work called for under said Contract in favor of all persons, firms, or corporations rendering such services or supplying such materials to the extent that claims are filed pursuant to the Civil Code, the Code of Civil Procedure, and/or the Government Code.

ARTICLE 11. CHANGE IN NAME AND NATURE OF CONTRACTOR'S LEGAL ENTITY

Should a change be contemplated in the name or nature of the Contractor's legal entity, the Contractor shall first notify the County in order that proper steps may be taken to have the change reflected on the Contract.

ARTICLE 12. PROHIBITED INTERESTS

No official of the County, and no County Representative who is authorized in such capacity and on behalf of the County to negotiate, make, accept, or approve, or to take part in negotiating, making, accepting or approving any architectural, engineering, inspection, construction or material supply contract or any subcontract in connection with construction of the Project, shall be or become directly or indirectly interested financially in this Contract or in any part thereof. No officer, employee, Construction Manager, Architect, attorney, engineer or Inspector of or for the County who is authorized in such capacity and on behalf of the County to exercise any executive, supervisory or other similar functions in connection with construction of the Project, shall become directly or indirectly interested financially in this Contract or in any part thereof.

ARTICLE 13. SEPARATE CONTRACTS

- a. The County reserves the right to let other contracts in connection with this work. Contractor shall afford other contractors reasonable opportunity for introduction and storage of their materials and execution of their work and shall properly connect and coordinate his work with theirs.
- b. If any part of Contractor's work depends for proper execution or results upon work of any other contractor, the Contractor shall inspect and promptly report to the Construction Manager any defects in such work that renders it unsuitable for such proper execution and results. His failure so to inspect and report shall constitute his acceptance of other contractor's work as fit and proper for reception of his work, except as to defects which may develop in the other contractor's work after execution of contractor's work.
- c. To insure proper execution of his subsequent work, Contractor shall measure and inspect work already in place and shall at once report to the Construction Manager any discrepancy between executed work and the Contract Documents.
- d. Contractor shall ascertain to his own satisfaction the scope of the Project and nature of any other contracts that have been or may be awarded by the County in prosecution of the Project to the end that Contractor may perform this Contract in the light of such other contracts, if any. Nothing herein contained shall be interpreted as granting to Contractor exclusive occupancy at site of the Project. Contractor shall not cause any unnecessary hindrance or delay to any other contractor working on the Project. If simultaneous execution of any contract for the Project is likely to cause interference with performance of some other contract or contracts, the County or County's Representative shall decide which Contractor shall cease work temporarily and which contractor shall continue or whether work can be coordinated so that contractors may proceed simultaneously. The County shall not be responsible for any damages suffered or for extra costs incurred by Contractor resulting directly or indirectly from award, performance, or attempted performance of any other contract or contracts on the Project or caused by any decision or omission of the County or County's Representative respecting the order of precedence in performance of contracts.

ARTICLE 14. SUBCONTRACTING

- a. Contractor agrees to bind every subcontractor by terms of the Contract as far as such terms are applicable to subcontractor's work. If Contractor subcontracts any part of this Contract, Contractor shall be as fully responsible to the County for the acts and omissions of his subcontractor and of persons either directly or indirectly employed by his subcontractor, as he is for acts and omissions of persons directly employed by himself. Nothing contained in these Contract Documents shall create any contractual relation between any subcontractor and the County. The County shall be deemed to be the third-party beneficiary of the contract between the Contractor and the subcontractor.
- b. The County's consent to or approval of any subcontractor under this Contract shall not in any way relieve Contractor of his obligations under this Contract and no such consent or approval shall be deemed to waive any provision of this Contract
- c. Substitution or addition of subcontractors shall be permitted only as authorized in chapter 4 (commencing at Section 4100), part 1, division 2 of the Public Contract Code.

ARTICLE 15. COUNTY'S RIGHT TO TERMINATE CONTRACT

- a. The County may, without prejudice to any other right or remedy, serve written notice upon Contractor and his surety of its intention to terminate this Contract if the Contractor (i) refuses or fails to prosecute the work or any separable part thereof with such diligence as will insure its completion within the time specified or any extension thereof, or (ii) fails to complete said work within such time, or (iii) if the Contractor should file a bankruptcy petition or be adjudged a bankrupt, or (iv) if he should make a general assignment for the benefit of his creditors, or (v) if a receiver should be appointed on account of his insolvency, or (vi) if he should persistently or repeatedly refuse or should fail, except in cases for which extension of time is provided, to supply enough properly skilled workers or proper materials to complete the work in time specified, or (vii) if he should fail to make prompt payment to subcontractors or for material or labor, or (viii) persistently disregard laws, ordinances or instructions of the County or those of County's Representatives, or (ix) otherwise be guilty of a substantial violation of any provision of the Contract, or (x) if he or his subcontractors should violate any

of the provisions of this Contract. The notice of intent to terminate shall contain the reasons for such intention to terminate. Unless within ten (10) calendar days after the service of such notice, such condition shall cease or such violation shall cease and satisfactory arrangements for the correction thereof be made, this Contract shall, upon the expiration of said ten (10) calendar days, cease and terminate. In such case, Contractor shall not be entitled to receive any further payment until work is finished. In event of any such termination, the County shall immediately serve written notice thereof upon surety and Contractor written notice of termination stating that the contract has ceased and is terminated. Surety shall have the right to investigate, take over and perform this Contract, provided, however, that if Surety, within fifteen (15) calendar days after service upon it of said notice of termination, does not give the County written notice of its intention to take over and perform this Contract and does not commence performance thereof within twenty (20) calendar days from the date of service upon it of such notice of termination, the County may take over the work and prosecute same to completion by contract or by any other method it may deem advisable for the account and at the expense of Contractor. Contractor and his surety shall be liable to the County for any excess cost or other damages occasioned the County thereby. If the County takes over the work as herein above provided, the County may, without liability for so doing, take possession of and utilize in completing the work such materials, appliances, plant, and other property belonging to the Contractor as may be on the site of the work and necessary therefore. If Surety does not perform the Project work itself, the Surety shall consult with the County regarding its planned choice of a contractor or contractors to complete the Project, and upon request by County, Surety shall provide County evidence of responsibility of Surety's proposed contractor or contractors. County shall be entitled to reject Surety's choice of contractor or contractors if County determines in its sole discretion that the contractor or contractors are not responsible. If Surety provides County written notice of its intention to take over and perform this Contract, within fifteen (15) calendar days of such written notice of intent to take over and perform, Surety or its chosen contractor or contractors (if such contractor or contractors are approved by County) shall provide County a detailed Progress Schedule as specified in Article 8 above. Contractor and his surety shall be liable to County for any excess cost or other damages occasioned the County as a result of Surety or Surety's contractor or contractors takeover and performance.

- b. If the unpaid balance of the Contract Price exceeds the expense of finishing work, including compensation for additional architectural, managerial, and administrative services, such excess shall be paid to Contractor. If such expense shall exceed such unpaid balance, Contractor shall pay the difference to the County. Expense incurred by the County as herein provided, and damage incurred through Contractor's default, shall be certified by the Construction Manager.
- c. Should the County determine that environmental considerations mandate that the underlying Project should not go forward, County may notify Contractor that this Contract is terminated due to environmental considerations and County shall only be obligated to pay Contractor for the work that Contractor had performed at the time of notification of termination of this Contract for environmental considerations.
- d. Termination For Convenience: The County may terminate performance of the work called for by the Contract Documents in whole or, from time to time, in part, if the County determines that a termination is in the County's interest. The Contractor shall terminate all or any part of the Work upon delivery to the Contractor of a Notice of Termination specifying that the termination is for the convenience of the County, the extent of termination, and the effective Date of such termination. After receipt of Notice of Termination, and except as directed by the County, the Contractor shall, regardless of any delay in determining or adjusting any amounts due under this Termination for Convenience clause, immediately proceed with the following obligations:
 - 1) Stop Work as specified in the Notice.
 - 2) Complete any Work specified in the Notice of Termination in a least cost/shortest time manner while still maintaining the quality called for under the Contract Documents.
 - 3) Leave the property upon which the Contractor was working and upon which the facility (or facilities) forming the basis of the Contract Documents is situated in a safe and sanitary manner such that it does not pose any threat to the public health or safety.
 - 4) Terminate all subcontracts to the extent that they relate to the portions of the work terminated.
 - 5) Place no further subcontracts or orders, except as necessary to complete the continued portion of the Contract.
 - 6) Submit to the County, within ten (10) calendar days from the Effective Date of the Notice of Termination, all of the usual documentation called for by the Contract Documents to substantiate all costs incurred by the Contractor for labor, materials and equipment through the Effective Date of the Notice of Termination. Any documentation substantiating costs incurred by the Contractor solely as a result of the County's exercise of its right to terminate this Contract pursuant to this clause, which costs the Contractor is authorized under the Contract Documents to incur, shall: (i) be submitted to and received by the County no later than thirty (30) calendar days after the Effective Date of the Notice of Termination; (ii) describe the costs incurred with particularity; and (iii) be conspicuously

identified as "Termination Costs occasioned by the County's Termination for Convenience." Termination of the Contract shall not relieve Surety of its obligation for any just claims arising out of or relating to the Work performed. In the event that the County exercises its right to terminate this Contract pursuant to this provision, the County shall pay the Contractor, upon the Contractor's submission of the documentation required by this clause and other applicable provisions of the Contract Documents, all actual reimbursable costs incurred according to the provisions of this Contract.

- e. Termination of Contract by Contractor: The Contractor may terminate the Contract upon ten (10) calendar days written notice to the County, whenever: (1) the entire Work has been suspended for ninety (90) consecutive days through no fault or negligence of the Contractor, and notice to resume the Work or to terminate the Contract has not been received from the County within this time period; or (2) the County should fail to pay the Contractor any substantial sums due it in accordance with the terms of the Contract and within the time limits prescribed. In the event of such termination, the Contractor shall have no claims against the County except for Work performed as of the date of termination.
- f. The foregoing provisions are in addition to and not in limitation of any other rights or remedies available to the County.
- g. Notwithstanding the foregoing provisions, this Contract may not be terminated or modified where a trustee-in-bankruptcy has assumed the Contract pursuant to 11 U.S.C. Section 365 (Federal Bankruptcy Act).

ARTICLE 16. GUARANTEE

- a. Besides guarantees required elsewhere, Contractor shall, and hereby does, guarantee all work for a period of one (1) year after date of acceptance of work by the County. Contractor shall repair or replace any or all such work, together with any other work, which may be displaced in so doing, that may prove defective in workmanship and/or materials within a two-year period from date of acceptance without expense whatsoever to the County, ordinary wear and tear, unusual abuse or neglect excepted. The County will give notice of observed defects with reasonable promptness. Contractor shall notify the County upon completion of repairs.
- b. In the event of failure of Contractor to comply with above-mentioned conditions within one week after being notified in writing, the County is hereby authorized to proceed to have defects repaired and made good at the expense of Contractor. Contractor hereby agrees to pay costs and charges therefor immediately on demand.
- c. If, in the opinion of the County or County's Representative, defective work creates a dangerous condition or requires immediate correction or attention to prevent further loss to the County or to prevent interruption of operations of the County, the County or the County's Representative will attempt to give the notice required by this Article. If the Contractor cannot be contacted or does not comply with the County's request for correction within a reasonable time as determined by the County, the County may, notwithstanding the provisions of this Article, proceed to make such correction or provide such attention. The costs of such correction or attention shall be charged against the Contractor. Such action by the County or its Representative will not relieve the Contractor of the guarantees provided in this Article or elsewhere in this Contract.
- d. This Article does not in any way limit the guarantee on any items for which a longer guarantee is specified or on any items for which a manufacturer gives a guarantee for a longer period. Contractor shall furnish the County with all appropriate guarantee or warranty certificates upon completion of the Project.

ARTICLE 17. NOTICE AND SERVICE THEREOF

- a. Any notice from one party to the other under the Contract shall be in writing and shall be dated and signed by party giving such notice or by the duly authorized representative of such party. Any such notice shall not be effective for any purpose whatsoever unless served in one of the following manners:
 - 1) If notice is given to the County, by personal delivery thereof to the Construction Manager or the County or by depositing same in United States mails, enclosed in a sealed envelope addressed to the County and for attention of the Construction Manager, postage prepaid and registered;
 - 2) If notice is given to Contractor by personal delivery thereof to said Contractor or to his foreman at site of Project, or by depositing same in United States mails, enclosed in a sealed envelope addressed to said Contractor at his regular place of business or at such other address as may have been established for the conduct of work under this Contract, postage prepaid and registered;
 - 3) If notice is given to surety or other person by personal delivery to such surety or other person or by depositing same in United States mails, enclosed in a sealed envelope addressed to such surety or person at the address of such surety or person last communicated by him to party giving notice, postage prepaid and registered.
 - 4) If notice is served by mail, it shall be deemed received and all time periods associated with the giving of notice shall run from the third day after mailing.

ARTICLE 18. WORKERS

- a. Contractor shall at all times enforce strict discipline and good order among his employees. Contractor shall not employ on work any unfit person or any one not skilled in work assigned to him.
- b. Any person in the employ of the Contractor whom the County or County's Representative may deem incompetent or unfit shall be dismissed from work and shall not again be employed on it except with the written consent of the County.

ARTICLE 19. PREVAILING RATES OF WAGES

- a. The Contractor is aware of the requirements of Labor Code Sections 1720 et seq. and 1770 et seq., as well as California Code of Regulations, Title 8, Section 16000 et seq. ("Prevailing Wage Laws"), which require the payment of prevailing wage rates and the performance of other requirements on certain "public works" and "maintenance" projects. Since this Project involves an applicable "public works" or "maintenance" project, as defined by the Prevailing Wage Laws, and since the total compensation is \$1,000 or more, Contractor agrees to fully comply with such Prevailing Wage Laws. The Contractor shall obtain a copy of the prevailing rates of per diem wages at the commencement of this Agreement from the website of the Division of Labor Statistics and Research of the Department of Industrial Relations located at www.dir.ca.gov/dlsr/. In the alternative, the Contractor may view a copy of the prevailing rates of per diem wages at the County's Facilities Department. Contractor shall make copies of the prevailing rates of per diem wages for each craft, classification or type of worker needed to perform work on the Project available to interested parties upon request and shall post copies at the Contractor's principal place of business and at the Project site. Contractor shall defend, indemnify, and hold the County, its elected officials, officers, employees and agents free and harmless from any claims, liabilities, costs, penalties or interest arising out of any failure or alleged failure to comply with the Prevailing Wage Laws.
- b. The Contractor and each subcontractor shall forfeit as a penalty to the County not more than fifty dollars (\$50) for each calendar day, or portion thereof, for each worker paid less than the stipulated prevailing wage rate for any work done by him, or by any subcontract under him, in violation of the provisions of the Labor Code. The difference between such stipulated prevailing wage rate and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the stipulated prevailing wage rate shall be paid to each worker by the Contractor.
- c. As a further material part of this Contract, Consultant agrees to hold harmless and indemnify the County, its Board and each member of the Board, its officers, employees, and agents from any and all claims, liability, loss, costs, damages, expenses, fines and penalties, of whatever kind or nature, including all costs of defense and attorneys' fees, arising from any alleged failure of Contractor or its subcontractors to comply with the prevailing wage laws of the State of California. If the County or any of the indemnified parties are named as a party in any dispute arising from the failure of Contractor or its subcontractors to pay prevailing wages, Contractor agrees that the County and the other indemnified parties may appoint their own independent counsel, and Contractor agrees to pay all attorneys' fees and defense costs of the County and the other indemnified parties as billed, in addition to all other damages, fines, penalties and losses incurred by the County and the other indemnified parties as a result of the action.
- d. Contractor shall post, at appropriate conspicuous points on the site of the Project, a schedule showing all determined general prevailing wage rates and all authorized deductions, if any, from unpaid wages actually earned.

ARTICLE 20. PAYROLL RECORDS

- a. Pursuant to Labor Code Section 1776, as amended from time to time, the Contractor and each subcontractor shall maintain weekly certified payroll records showing the name, address, social security number, work classification, straight time and overtime hours paid each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by him or her in connection with the work. Contractor shall certify under penalty of perjury that records maintained and submitted by Contractor are true and accurate. Contractor shall also require subcontractor(s) to certify weekly payroll records under penalty of perjury.
- b. The payroll records enumerated under Article 21(a) above shall be certified and submitted by the Contractor at a time designated by the County. The Contractor shall also provide the following:
 - 1) A certified copy of the employee's payroll records shall be made available for inspection or furnished to such employee or his or her authorized representative on request.
 - 2) A certified copy of all payroll records enumerated in Article 21(a) shall be made available for inspection or furnished upon request of the Department of Industrial Relations ("DIR").
- c. The certified payroll records shall be on forms provided by the Division of Labor Standards Enforcement ("DLSE") of the DIR or shall contain the same information as the forms provided by the DLSE.

- d. Any copy of records made available for inspection and furnished upon request to the public shall be marked or obliterated in such a manner as to prevent disclosure of an individual's name, address, and social security number. The name and address of the Contractor or any subcontractor performing Work on the Project shall not be marked or obliterated.
- e. In the event of noncompliance with the requirements of this Section, the Contractor shall have ten (10) days in which to comply subsequent to receipt of written notice specifying item or actions necessary to ensure compliance with this section. Should noncompliance still be evident after such ten (10) day period, the Contractor shall, as a penalty to the County, forfeit Twenty-five Dollars (\$25.00) for each calendar day, or portion thereof, for each worker until strict compliance is effectuated. Upon the request of the DIR, such penalties shall be withheld from contract payments.

ARTICLE 21. EMPLOYMENT OF APPRENTICES

- a. The Contractor's attention is directed to the provisions of Sections 1777.5, 1777.6, and 1777.7 of the Labor Code concerning employment of apprentices by the Contractor or any subcontractor under him. The Contractor shall obtain a certificate of apprenticeship before employing any apprentice pursuant to Section 1777.5, 1777.6, and 1777.7 of the Labor Code.
- b. Information relative to apprenticeship standards, wage schedules, and other requirements may be obtained from the Director of Industrial Relations, ex officio the Administrator of Apprenticeship, San Francisco, California, or from the Division of Apprenticeship Standards and its branch offices.
- c. Knowing violations of Section 1777.5 will result in forfeiture not to exceed \$100 for each calendar day of non-compliance pursuant to Section 1777.7.

ARTICLE 22. HOURS OF WORK

- a. Eight (8) hours of work shall constitute a legal day's work. The Contractor and each subcontractor shall forfeit, as penalty to the County, twenty-five dollars (\$25) for each worker employed in the execution of work on the Project by the Contractor or any subcontractor under him for each calendar day during which such worker is required or permitted to work more than eight (8) hours in any one calendar day and forty (40) hours in any calendar week in violation of the provisions of the Labor Code, and in particular, Section 1810 to Section 1815, thereof, inclusive, except that work performed by employees of the Contractor and his subcontractors in excess of eight hours per day at not less than one and one-half times the basic rate of pay, as provided in Labor Code Section 1815.
- b. Generally, construction work on the Project shall be accomplished on a regularly scheduled eight (8) hour per day work shift basis, Monday through Friday, between the hours of 7:00 a.m. and 5:00 p.m., however nothing herein shall prevent Contractor from working weekends and after hours in order to complete the Project so long as not otherwise prohibited by law or local ordinances or regulations.

ARTICLE 23. DEBARMENT OF CONTRACTORS AND SUBCONTRACTORS

The Contractor, or any subcontractor working under the Contractor, may not perform work on a public works project with a subcontractor who is ineligible to perform work on a public project pursuant to Section 1777.1 or Section 1777.7 of the Labor Code. Any contract on a public works project entered into between the Contractor and a debarred subcontractor is void as a matter of law. A debarred subcontractor may not receive any public money for performing work as a subcontractor on a public works contract. Any public money that is paid or may have been paid to a debarred subcontractor by the Contractor on the project shall be returned to the County. The Contractor shall be responsible for the payment of wages to workers of a debarred subcontractor who has been allowed to work on the project.

ARTICLE 24. NON-DISCRIMINATION

Pursuant to the provisions of Labor Code Section 1735, Contractor and its subcontractor shall not unlawfully discriminate in the employment of persons on this Project because of race, religious creed, color, national origin, ancestry, physical handicap, medical condition, marital status, and sex.

ARTICLE 25. WORKERS' COMPENSATION INSURANCE

The Contractor shall provide, during the life of this Contract, workers' compensation insurance for all of the employees engaged in work under this Contract, on or at the site of the Project, and, in case any of his work is sublet, the Contractor shall require the subcontractor similarly to provide workers' compensation insurance for all the latter's employees. Any class of employee or employees not covered by a subcontractor's insurance shall be covered by the Contractor's insurance. In case any class of employees engaged in work under this Contract, on or at the site of the Project, is not protected under the Workers' Compensation Statutes, the Contractor shall provide or shall cause a subcontractor to provide, adequate insurance coverage for the protection of such employees not otherwise protected. The Contractor is required to secure payment of compensation to his employees in accordance with the provisions of Section 3700 of the Labor Code. The Contractor shall file with the County certificates of his insurance protecting

workers. Company or companies providing insurance coverage shall be acceptable to the County, if in the form and coverage as set forth in Article 30.

ARTICLE 26. EMPLOYER'S LIABILITY INSURANCE

Contractor shall provide during the life of this Contract, Employer's Liability Insurance in the amount of, at least, one million dollars (\$1,000,000.00) per accident for bodily injury and disease. Contractor shall provide County with a certificate of Employer's Liability Insurance. Such insurance shall comply with the provisions of Article 30 below.

ARTICLE 27. COMMERCIAL GENERAL LIABILITY AND PROPERTY DAMAGE INSURANCE

- a. Contractor shall procure and maintain during the life of this Contract and for such other period as may be required herein, at its sole expense, such comprehensive general liability insurance or commercial general liability and property damage insurance as shall protect Contractor and the County, the County's Representatives and Agents, from all claims for bodily (personal) injury, including accidental death, as well as claims for property damage arising from operations under this Contract, and other covered loss, however occasioned, occurring during the policy term. Such policy shall comply with all the requirements of this Article and shall be in the form and amounts as set forth in the Supplementary Conditions hereof. The limits set forth in the Supplementary Conditions shall apply separately to each insured against whom claims are made or suits are brought, except with respect to the limits of liability. Further the limits set forth in the Supplementary Conditions shall not be construed to relieve the Contractor from liability in excess of such coverage, nor shall it limit Contractor's indemnification obligations to the County and shall not preclude the County from taking such other actions available to the County under other provisions of the Contract Documents or law.
- b. Contractor shall make certain that any and all subcontractors hired by Contractor are insured in accordance with this Contract. If any subcontractor's coverage does not comply with the foregoing provisions, Contractor shall indemnify and hold the County harmless from any damage, loss, cost, or expense, including attorneys' fees, incurred by the County as a result thereof.
- c. Company or companies providing insurance coverage shall be acceptable to the County and authorized to conduct business in the State of California. d. All general liability policies provided pursuant to the provisions of this Article shall comply with the provisions of Article 30 below.
- e. All general liability policies shall be written to apply to all bodily injury, including death, property damage, personal injury, owned and non-owned equipment, blanket contractual liability, completed operations liability, explosion, collapse, under-ground excavation, removal of lateral support, and other covered loss, however occasioned, occurring during the policy term, and shall specifically insure the performance by Contractor of that part of the indemnification contained in Article 31 hereof, relating to liability for injury to or death of persons and damage to property. If the coverage contains one or more aggregate limits, a minimum of 50% of any such aggregate limit must remain available at all times; if over 50% of any aggregate limit has been paid or reserved, the County may require additional coverage to be purchased by Contractor to restore the required limits. Contractor may combine primary, umbrella, and as broad as possible excess liability coverage to achieve the total limits indicated above. Any umbrella or excess liability policy shall include the additional insured endorsement described in Article 30 below.

ARTICLE 28. AUTOMOBILE LIABILITY INSURANCE

Contractor shall take out and maintain at all times during the term of this Contract Automobile Liability Insurance in the amount set forth in the Supplementary Conditions. Such insurance shall provide coverage for bodily injury and property damage including coverage for non-owned and hired vehicles, in a form and with insurance companies acceptable to the County. Such insurance shall comply with the provisions of Article 31 below.

ARTICLE 29. BUILDER'S RISK [FIRE; "ALL RISK"]

PROPERTY IN COURSE OF CONSTRUCTION: County is automatically covered under its existing Memorandum of Property coverage subject to the following exceptions:

Contractor's equipment is excluded under this course of extension.

ARTICLE 30. PROOF OF CARRIAGE OF INSURANCE

- a. Contractor shall, as soon as practicable following the placement of insurance required hereunder, but in no event later than the effective date of the Contract, deliver to the County certificates of insurance evidencing the same, together with appropriate separate endorsements thereto, evidencing that Contractor has obtained such coverage for the period of the Contract. Contractor shall deliver certified copies of the actual insurance policies specified herein, within thirty days after commencement of work. Thereafter, copies of renewal policies, or certificates and appropriate separate endorsements thereof, shall be delivered to the County within thirty (30) calendar days prior to the expiration of the term of any policy required herein. Contractor shall permit the County at all reasonable times to inspect any policies of insurance of Contractor which Contractor has not delivered to the County.

- b. Certificates and insurance policies shall include the following clause:
- 1) This policy shall not be canceled or reduced in required limits of liability or amounts of insurance until notice has been mailed to the County stating date of cancellation, reduction or other adverse change respecting such insurance. The date of cancellation, reduction or adverse change may not be less than thirty (30) calendar days after date of mailing notice."
- c. Any notice required to be sent pursuant to this Article shall be to the County's address as shown in the Advertisement for Bids.
- d. Certificates of insurance shall state in particular those insured, extent of insurance, location and operation to which insurance applies, expiration date, and cancellation and reduction notice. All Certificates of Insurance provided by Contractor shall name the County, the Construction Manager and Architect, and Construction Manager's and Architect's consultants as additional insured.
- e. The coverage afforded by the additional insured endorsement described in paragraph (d) above, shall apply as primary insurance, and any other insurance maintained by the County owner, the members of the County's Board of Supervisors, or its officers, agents, employees and volunteers, or any self-funded program of the County, shall be in excess only and not contributing with such coverage. This coverage must be given via ISO endorsement CG 2010 (11/85 ed.) or insurer's equivalent for coverage as respects: liability arising out of activities performed by or on behalf of the Contractors; products and completed operations of the Contractor; premises owned, occupied or used by the Contractor; or automobiles owned, leased, hired or borrowed by the Contractor. The coverage shall contain no special limitations on the scope of protection afforded to the County, its board of trustees, directors, officers, employees, agents or authorized volunteers.
- f. Insurance carriers shall be qualified to do business in California and maintain an agent for service of process within the State. Such insurance carriers shall have not less than an "A" policy holder's rating and a financial rating of not less than "Class VII" according to the latest Best's Key Rating Guide unless otherwise approved by the County.
- g. After receiving written Notice of Cancellation of Insurance, Contractor shall have ten (10) calendar days to provide other policies of insurance similar to the canceled policies and acceptable insurance. If such replacement coverage is not provided, the County may secure insurance at the Contractor's expense.
- h. Nothing contained in the insurance requirements shall be construed as limiting the extent of the Contractor's responsibility for payment of damages resulting from operations under this Contract.
- i. Contractor's failure to procure the insurance specified herein, or failure to deliver certified copies or appropriate certificates of such insurance, or failure to make the premium payments required by such insurance, shall constitute a material breach of the Contract, and the County may, at its option, terminate the Contract for any such default by Contractor.
- j. The requirements as to the types and limits of insurance coverage set forth herein and in the Supplementary Conditions to be maintained by the Contractor, and any approval of said insurance by the County or its insurance Contractor(s), are not intended to and shall not in any manner limit or qualify the liabilities and obligations otherwise assumed by the Contractor pursuant to the Contract, including, but not limited to, the provisions concerning indemnification.
- k. The County shall retain the right at any time to review the coverage, form, and amount of insurance required herein and may require Contractor to obtain insurance reasonably sufficient in coverage, form and amount to provide adequate protection against the kind and extent of risk which exists at the time a change in insurance is required.
- l. All deviations from the contractual insurance requirements stated herein must be approved in writing by the County's risk manager.
- m. Included in any policy or policies of liability insurance provided by Contractor hereunder, except Workers' Compensation Insurance, shall be a standard waiver of rights of subrogation against the County, its Representatives, or Agents, by the insurance company issuing said policy or policies.
- n. If coverage is written on a "claims made" basis, the Certificate of Insurance shall clearly so state. In addition to the coverage requirements specified above, such policy shall provide that:
- 1) The policy retroactive date coincides with or precedes Contractor's commencement of work under the Contract (including subsequent policies purchased as renewals or replacements)
 - 2) Contractor will make every effort to maintain similar insurance during the required extended period of coverage following expiration of the Contract, including the requirement of adding all additional insureds) If insurance is terminated for any reason, Contractor shall purchase an extended reporting provision of at least two years to report claims arising in connection with the Contract.
- o. The policy allows for reporting of circumstances or incidents that might give rise to future claims.

- p. Contractor shall notify the County in writing of the amount, if any, of self-insured retention provided under the General Liability coverage, with a maximum limit of \$25,000. The County may approve higher retention amounts, based upon review of documentation submitted by Contractor. Such review shall take into consideration Contractor's net worth and reserves for payment of claims of liability against Contractor, which must be sufficient to adequately compensate for the lack of other insurance coverage required hereunder.

ARTICLE 31. INDEMNIFICATION

The County and its Board members, directors, officers, employees, agents and authorized volunteers, County's Representative, the Construction Manager, and the Architect, shall not be answerable or accountable in any manner for any loss or damage that may happen to the work or any part thereof, or for any of the materials or other things used or employed in performing the Work, of for injury or damage to any person or persons, either workers, employees of Contractor or its subcontractors or the public, or for damage to adjoining or other property, from any cause whatsoever arising out of or in connection with the performance of the Work. The Contractor shall be responsible for any damage to adjoining or other property, from any cause whatsoever arising out of or in connection with the performance of the work. The Contractor shall be responsible for any damage or injury to any person or property resulting from defects or obstructions or from any cause whatsoever arising out of or in connection with the performance of the Work; provided, however, that the Contractor shall not be liable for the sole established negligence, willful misconduct or active negligence of the County, its Board members, directors, officers, employees, agents and authorized volunteers who are directly responsible to the County.

- a. Contractor shall indemnify the County and its Board members, directors, officers, employees, agents, authorized volunteers, the County's Representatives, the Construction Manager and the Architect against and will hold and save them and each of them harmless from any and all actions, claims, damages to persons or property, penalties, obligations or liabilities that may be asserted or claimed by any person, firm entity, corporation, political subdivision or other organization arising out of or in connection with the Work, operation or activities of Contractor, its agents, employees, subcontractors or invitees, provided for herein, whether or not there is concurrent passive or active negligence on the part of the County, or its Board members, directors, officers, employees, agents, and authorized volunteers, the County's Representative, the Construction Manager, and the Architect, but excluding such actions, claims, damages to persons or property penalties, obligations or liabilities arising from the sole established negligence, willful misconduct or active negligence of the County, the County's Representative, the Construction Manager, the Architect, or those who are directly responsible to them, and in connection therewith:
- 1) Contractor will defend any action or actions filed in connection with any of said claims, damages, penalties, obligations or liabilities and will pay all costs and expenses, including attorney's fees incurred in connection therewith.
 - 2) Contractor will promptly pay any judgment rendered against Contractor, the County and its Board members, directors, officers, employees, agents, authorized volunteers, the County's Representative, the Construction Manager, and the Architect, covering such claims, damages, penalties, obligations and liabilities arising out of or in connection with such work, operations, or activities of Contractor hereunder and Contractor agrees to save and hold the County and its members, directors, officers, employees, agents, authorized volunteers, the County's Representative, the Construction Manager, and the Architect harmless therefrom.
 - 3) In the event the County and its Board members, directors, officers, employees, agents, authorized volunteers, the County's Representative, the Construction Manager, and the Architect are made a party to any action or proceeding filed or prosecuted against Contractor for such damages or other claims arising out of or in connection with the Work, or operation or activities of Contractor hereunder, Contractor agrees to pay to the County, the County's Representative, the Construction Manager and the Architect, and its Board members, directors, officers, employees, agents, authorized volunteers, the County's Representative, the Construction Manager, and the Architect any and all costs and expenses incurred by the County and its Board members, directors, officers, employees, agents and authorized volunteers, the County's Representative, the Construction Manager and the Architect, in such action or proceeding together with reasonable attorney's fees.
 - 4) The County may retain, to the extent it deems necessary, the money due to the Contractor under and by virtue of the Contract Documents until disposition has been made of such actions or claims for damages as specified herein above.

ARTICLE 32. PERSONAL LIABILITY

Neither the County, the County's Representative, the Engineer, Construction Manager, Architect, nor any other director, officer or authorized assistant or agent of the County, the County's Representative, or the Engineer, Construction Manager, or Architect shall be personally responsible for any liability arising under the Contract.

ARTICLE 33. LAWS AND REGULATIONS

- a. Contractor shall give all notices and comply with all laws, ordinances, rules, and regulations bearing on conduct of work as indicated and specified. If Contractor observes that drawings and specifications are at variance therewith, he shall promptly notify the Construction Manager in writing and any necessary changes shall be adjusted as provided for in this Contract for changes in work. If Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Construction Manager, he shall bear all costs arising therefrom.
- b. Contractor shall be responsible for familiarity with the Americans with Disabilities Act ("ADA") (42 USC §12101 et seq.). Installations of equipment and other devices shall be in compliance with ADA regulations.

ARTICLE 34. PERMITS AND LICENSES

Building permit, and other required permits and licenses necessary for prosecution of work shall be secured and paid for by Contractor, unless otherwise specified.

ARTICLE 35. INSPECTION FEES FOR PERMANENT UTILITIES

All inspection fees and other municipal charges for permanent utilities including, but not limited to, sewer, electrical, phone, gas, water, and irrigation shall be paid for by the County. Contractor shall be responsible for arranging the payment of such fees, but inspection fees and other municipal fees relating to permanent utilities shall be paid by the County. Contractor may either request reimbursement from the County for such fees or obtain the funds from the County prior to paying such fees.

ARTICLE 36. EASEMENTS

Easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the County, unless otherwise specified.

ARTICLE 37. SURVEYS

Surveys to determine location of property lines and corners will be supplied by the County. Surveys to determine locations of construction, grading, and site work shall be provided by Contractor.

ARTICLE 38. EXCISE TAXES

If under federal excise tax law any transaction hereunder constitutes a sale on which a federal excise tax is imposed and the sale is exempt from such excise tax because it is a sale to a state or local government for its exclusive use, the County, upon request, will execute a certificate of exemption which will certify (1) that the County is a political subdivision of the state for the purposes of such exemption and (2) that the sale is for the exclusive use of the County. No excise tax for such materials shall be included in any bid price.

ARTICLE 39. PATENTS, ROYALTIES, AND INDEMNITIES

The Contractor shall indemnify, defend and hold harmless the County and its Board Members, officers, agents, and employees harmless from liability of any nature or kind, including cost and expense, for or on account of any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of this Contract, including its use by the County, unless otherwise specifically stipulated in the Contract Documents.

ARTICLE 40. MATERIALS

- a. Except as otherwise specifically stated in this Contract, Contractor shall provide and pay for all materials, labor, tools, equipment, water, lights, power, transportation, superintendence, temporary constructions of every nature, and all other services and facilities of every nature whatsoever necessary to execute and complete this Contract within specified time.
- b. Unless otherwise specified, all materials shall be new and the best of their respective kinds and grades as noted and/or specified, and workmanship shall be of good quality.
- c. Materials shall be furnished in ample quantities and at such times as to insure uninterrupted progress of work and shall be stored properly and protected as required. Contractor shall be entirely responsible for damage or loss by weather or other causes to materials or work under this Contract.
- d. No materials, supplies, or equipment for work under this Contract shall be purchased subject to any chattel mortgage or under a conditional sale or other agreement by which an interest therein or in any part thereof is retained by seller or supplier. Contractor warrants good title to all material, supplies, and equipment installed or incorporated in work and agrees upon completion of all work to deliver premises, together with all improvements and appurtenances constructed or placed thereon by him, to the County free from any claims, liens, or charges. He further agrees that neither he nor any person, firm, or corporation furnishing any materials or labor for any work covered by this Contract shall have any right to lien upon premises or any improvement or appurtenance thereon, except that Contractor may install metering devices or other equipment of utility companies or of political subdivisions title to which is commonly retained by utility

company or political subdivision. In event of installation of any such metering device or equipment, Contractor shall advise the County as to the owner thereof. Nothing contained in this Article, however, shall defeat or impair right of persons furnishing material or labor under any bond given by Contractor for their protection or any rights under any law permitting such persons to look to funds due Contractor in hands of the County, and this provision shall be inserted in all subcontracts and material contracts and notice of its provisions shall be given to all persons furnishing material for work when no formal contract is entered into for such material.

- e. Materials shall be stored on the premises in such manner so as not to interfere with the work and so that no portion of the structure shall be overloaded.
- f. Materials or work required or necessary to be tested shall be tested under supervision of, as directed by and at such places as may be convenient to the County and/or the County's Representatives. The required testing of all structural materials shall be done by an approved testing laboratory as pursuant to Article 70, herein.

ARTICLE 41. SUBSTITUTIONS

- a. For purposes of this provision the term "substitution" shall mean the substitution of any material, process or article that is substantially equal or better in every respect to that so indicated or specified in the specifications.
- b. Pursuant to Public Contract Code Section 3400(b) the County may make a finding that is described in the invitation for bids that designates certain products, things, or services by specific brand or trade name for the statutorily enumerated purposes. As required by Section 3400 (b) the County has made such findings as further described in the Supplementary Conditions.
- c. Unless specifically designated in the Supplementary Conditions, whenever in specifications any material, process, or article is indicated or specified by grade, patent, or proprietary name or by name of manufacturer, such specifications shall be deemed to be used for the purpose of facilitating the description of the material, process or article desired and shall be deemed to be followed by words "or equal." Contractor may, unless otherwise stated, offer for substitution any material, process or article which shall be substantially equal or better in every respect to that so indicated or specified. However, the County has adopted certain uniform standards for certain materials, processes and articles. If any material, process or article offered for substitution is not, in the opinion of the Architect and the County, substantially equal or better in every respect to that specified, Contractor shall furnish the material, process or article specified. The burden of proof as to the equality of any material, process or article shall rest with the Contractor.
- d. Contractor shall submit requests together with substantiating data for substitution of any "or equal" material, process or article no later than 5 days prior to bid opening. Provisions authorizing submission of "or equal" substitution justification data shall not in any way authorize an extension of time for performance of this Contract. Furthermore, if a proposed "or equal" substitution request is rejected, Contractor shall be responsible for including the specified material, process or article in its bid. The County shall not be responsible for any costs associated with "or equal" substitution requests. The County has the complete and sole discretion to determine if a material, process or article is an "or equal" material, process or article that may be substituted.
- e. For purposes of subdivision (d) above, data required to substantiate requests for substitutions of an "or equal" material, process or article shall include a signed affidavit from the Contractor stating that the substituted "or equal" material, process or article is equivalent to that specified in the specification in every way except as listed on the affidavit. Substantiating data shall also include any and all illustrations, specifications, and other relevant data including catalogue information which describes the requested substituted "or equal" material, process or article and substantiates that it is an "or equal" to the material process or article specified. In addition, the submittal documentation must also include a statement of the cost implications of the substitution being requested stating whether and why the substitution of the "or equal" material, process or article will reduce or increase the Contract Price. The substantiating data must also include information regarding the durability and lifecycle cost of the requested substituted "or equal" material, process or article. Failure to submit all the needed substantiating data, including the signed affidavit, to the Construction Manager in a timely fashion so that the substitution can be adequately reviewed may result in the rejection of the proposed substitution. The Construction Manager and Architect are not obligated to review multiple substitution submittals for the same product or item due to the Contractor's failure to submit a complete package initially.
- f. Time limitations in this Article must be complied with strictly and in no case will an extension of time for completion be granted because of Contractor's failure to request the substitution of an alternative item at the times and manner set forth herein in subdivision (d). Further, the Contractor shall bear the costs of all engineering work associated with the review of submittals for substitution of equals.
- g. In event Contractor furnishes material, process, or article more expensive than that specified, the difference in cost of such material, process, or article so furnished shall be borne by Contractor.

ARTICLE 42. SHOP DRAWINGS

- a. Contractor shall check and verify all field measurements and shall submit with such promptness as to cause no delay in his own work or in that of any other contractor, subcontractor, Construction Manager, Architect, other independent contractor or worker on the Project, five (5) copies of all shop or setting drawings, schedules, and materials list, and all other submittals in accordance with other provisions of the Contract required for the work of various trades. Contractor shall sign all submittals affirming that submittals have been reviewed and approved by Contractor prior to submission to Construction Manager. Each signed submittal shall affirm that the submittal meets all the requirements of the Contract Documents except as specifically and clearly noted and listed on the cover sheet of the submittal.
- b. Contractor shall advise the County immediately, if Construction Manager and/or Architect have not checked and approved with reasonable promptness, such schedules and drawings for conformance with design concept of Project and compliance with information given in the Contract Documents. Contractor shall make any corrections required by the Architect, and file with the Construction Manager five (5) corrected copies each and furnish such other copies as may be needed for construction. Architect's approval of such drawings or schedules also shall not relieve Contractor from responsibility for deviations from drawings or specifications unless Contractor has in writing called Construction Manager's attention to such deviations at time of submission and has secured the Architect's written approval. Architect's approval of such drawings and schedules also shall not, nor shall it relieve him from responsibility for errors in shop drawings or schedules. For purposes of this Article "reasonable promptness" shall mean such reasonable promptness as to cause no delay in the work or in the activities of the County, Contractor, or separate contractors, while allowing sufficient time in the Construction Manager and Architect's professional judgment to permit adequate review. In contracts in excess of \$1 million, "reasonable promptness" shall mean such reasonable promptness as to not affect the critical path.

ARTICLE 43. SUBMITTALS

- a. Contractor shall furnish for approval, within fourteen (14) calendar days following award of Contract a log of all samples, material lists and certifications, mix designs, schedules, and other submittals, as required in specifications. Such log shall indicate whether samples will be provided as specified and in accordance with other provisions of this Contract.
- b. Contractor will provide samples and submittals, together with catalogs and supporting data required by the Architect to the Construction Manager within a reasonable time period so as not to cause delays on the Project.
- c. This provision shall not authorize any extension of time for performance of this Contract. Architect will check and approve such samples, only for conformance with design concept of work and for compliance with information given in the Contract Documents. Work shall be in accordance with approved samples. Architect's action will be taken within fourteen (14) calendar days after receiving such samples and submittals. If in the Construction Manager's and/or Architect's professional judgment fourteen (14) calendar days is an insufficient amount of time to permit adequate review, Construction Manager shall, within the initial fourteen (14) calendar days period, notify the Contractor, with a copy to the Inspector and the County, of the amount of time that will be required to respond.
- d. If the Architect's response results in a change in the Project, then such change shall be effected by a written change order.

ARTICLE 44. COST BREAKDOWN AND PERIODICAL ESTIMATES

- a. Contractor shall furnish on forms approved by the County:
 - 1) Within ten (10) calendar days of award of Contract a detailed estimate giving a complete breakdown of Contract Price; and
 - 2) A periodical itemized estimate of work done for the purpose of making partial payments thereon;
 - 3) Within ten (10) calendar days of request by the County, a schedule of estimated monthly payments which shall be due him under the Contract.
- b. Values employed in making up any of these schedules will be used only for determining basis of partial payments and will not be considered as fixing a basis for additions to or deductions from Contract Price.

ARTICLE 45. PAYMENTS

- a. Each month within thirty (30) calendar days after receipt of an undisputed and properly submitted payment request, there shall be paid to Contractor a sum equal to ninety five percent (95%) of the value of work performed up to the last day of the previous month, less the aggregate of previous payments. Monthly payments shall be made only on the basis of monthly estimates which shall be prepared by Contractor on a form approved by the County and filed with the County before the fifth day of the month during which payment

is to be made. Work completed as estimated shall be an estimate only and no inaccuracy or error in said estimate shall operate to release Contractor or any bondsman from damages arising from such work or from enforcing each and every provision of this Contract and the County shall have the right subsequently to correct any error made in any estimate for payment. Contractor shall not be entitled to have any payment estimates processed or be entitled to have any payment made for work performed so long as any lawful or proper direction concerning work, or any portion thereof given by the County, Construction Manager and/or Architect shall remain uncomplied with.

- b. The final payment of five percent (5%) of the value of work done under this Contract, if unencumbered, shall be made within sixty (60) calendar days after the date of completion of the work, provided however, that in the event of a dispute between the County and the Contractor, the County may withhold from the final payment an amount not to exceed one hundred and fifty percent (150%) of the disputed amount. Completion means any of the following as provided by Public Contract Code Section 7107:
 - 1) The occupation, beneficial use, and enjoyment of a work of improvement, excluding any operation only for testing, startup, or commissioning, by the public agency, or its agent, accompanied by cessation of labor on the work of improvement.
 - 2) The acceptance by the public agency, or its agent, or the work of improvement.
 - 3) After the commencement of a work of improvement, a cessation of labor on the work of improvement for a continuous period of 100 calendar days or more, due to factors beyond the control of the Contractor.
 - 4) After the commencement of a work of improvement, a cessation of labor on the work of improvement for a continuous period of 30 calendar days or more, if the public agency files for record a notice of cessation or a notice of completion
- c. This Contract is subject to the provisions of Public Contract Code Section 7107.
- d. For purposes of this Contract, the acceptance by the County means acceptance made only by an action of the governing body of the County in session. Acceptance by Contractor of said final payment shall constitute a waiver of all claims against the County arising from this Contract. At any time after fifty percent (50%) of the work has been completed, if the County, by action of its governing body, finds that satisfactory progress is being made, the County may make any of the remaining payments in full for actual work completed or may withhold any amount up to five percent (5%) thereof as the County may find appropriate based on the Contractor's progress.
- e. Final Payment. The County shall, after the satisfactory completion of the work, make a final estimate of the amount of Work done thereunder and the value of said work, and the County shall pay the entire sum so found to be due after deduction therefrom all previous payments and all amounts to be retained under the provisions of the Contract Documents, provided that a release of liens and claims has been received from the Contractor pursuant to Civil Code Section 3262. All prior partial estimates and payments shall be subject to correction in the final estimate and payment. The final payment shall not be due and payable until the expiration of thirty-five (35) calendar days from the date of acceptance of the work by the County, which acceptance shall be by formal action of the Board of Supervisors.
 - 1) No certificate given, or payments made under the Contract, except the final certificate or final payment shall be evidence of the performance of the Contract, either wholly or in part, and no payment shall be construed to be an acceptance of any defective work or improper materials.
- f. Whenever any part of the work is in a condition suitable for use, and the best interest of the County requires such use, the County may take possession of, connect to, open for public use, or use a part thereof. When so used, maintenance and repairs due to ordinary wear and tear or vandalism will be made at County's expense. The use by the County as contemplated in this Article shall in no case be construed as constituting acceptance of the work or any part thereof. Such use shall neither relieve the Contractor of any of his responsibilities under the Contract nor act as a waiver by the County of any of the conditions thereof. Contractor shall continue to maintain all insurance, including Builder's Risk insurance, on the Project.

ARTICLE 46. PAYMENTS WITHHELD

- a. In addition to amounts which the County may retain under any and all other Articles in this Contract including those entitled "Payments," and "Time for Completion and Liquidated Damages," the County may withhold a sufficient amount or amounts of any payment or payments otherwise due to Contractor, as in his judgment may be necessary to cover:
 - 1) Payments which may be past due and payable for just claims against Contractor or any subcontractors for labor or materials furnished in and about the performance of work on the Project under this Contract.
 - 2) Defective work not remedied.

- 3) Failure of Contractor to make proper payments to his subcontractor or for material or labor.
 - 4) Completion of the Contract if there exists a reasonable doubt that the work can be completed for balance then unpaid.
 - 5) Damage to another Contractor.
 - 6) Amounts which may be due the County for just claims against Contractor.
 - 7) Failure of Contractor to keep the record ("as-built") drawings up to date.
 - 8) Failure to provide update on construction schedule as required by Article 8 hereof. When the above grounds are removed, payment shall be made for amounts withheld because of them.
 - 9) Site cleanup.
- b. The County may apply such withheld amount or amounts to payment of such claims or obligations at its discretion with the exception of subsections (a)(1), (3), and (5) of this Article, which must be retained or applied in accordance with applicable law. In so doing, the County shall be deemed the agent of Contractor and any payment so made by the County shall be considered as a payment made under contract by the County to Contractor and the County shall not be liable to Contractor for such payments made in good faith. Such payments may be made without prior judicial determination of claim or obligations. The County will render Contractor a proper accounting of such funds disbursed on behalf of Contractor.

ARTICLE 47. CHANGES AND EXTRA WORK

- a. **Changes In Work.** The County, without invalidating the Contract, and as provided by law, may order extra work or make changes by altering, adding to, or deducting from work, the Contract sum being adjusted accordingly. All such work shall be subject to prevailing wage rates and shall be executed under the conditions of the original contract except that any claim for extension of time caused thereby shall be adjusted at the time of ordering such change.
- b. In giving instructions, Contractor agrees that the Construction Manager and Architect, together, shall have authority to make minor changes in work, not involving change in cost, and not inconsistent with the purposes or approvals of the Project. Otherwise, except in an emergency endangering life or property, no extra work or change shall be made unless pursuant to a written order from the County, and no claim for an addition to the Contract sum shall be valid unless so ordered. If the Contractor is delayed in completing the work by reason of any change made pursuant to this Article, the time for completion of the Work shall be extended by change order for a period commensurate with such delay. The Contractor shall not be subject to any claim for liquidated damages for this period of time.
- c. **Unforeseen Conditions.** Contractor shall provide the County's Construction with notice of unforeseen conditions immediately upon discovery of such conditions.
- d. Value of any such extra work, change, or deduction shall be determined at the discretion of the County, in consultation with the Construction Manager and Architect, in one or more of the following ways:
 - 1) By acceptable lump sum proposal from Contractor with itemization as required by the Construction Manager.
 - 2) By unit prices contained in Contractor's original bid and incorporated in the Contract Documents or fixed by subsequent agreement between the County and Contractor.
 - 3) By the actual cost of material and labor and a percentage for overhead and profit. The following form shall be followed as applicable for additions and deductions to the Contract:

EXTRA/ (CREDIT)

(a) Material (attach itemized quantity and unit cost plus sales tax)	
(b) Labor (attach itemized hours and base rates from identified prevailing wage rate schedules)	
(c) Commercial General Liability and Property Damage Insurance, Workers' Compensation Insurance, Social Security and Unemployment taxes at actual and verified cost.	
(d) Subtotal	
(e) Subcontractor's overhead and profit as defined in Article 47 (h), below, not to exceed 15% of Item (d)	

(if applicable)	
(f) Subtotal	
(g) Contractor's Overhead and Profit, as defined in Article 47 (h), below, not to exceed 5% of Item (f) for work performed by subcontractor, or 15% if performed by Contractor \	
(h) Subtotal	
(i) Bond Premium, not to exceed 1% of Item (h)	
(j) Total	

- e. Regardless of whether the cost of the change order is determined pursuant to 1, 2, or 3, above, in addition to the cost of the material and labor for deleted items, Contractor shall credit back overhead mark-up and the bonding mark up for deleted items at the time of the request for changes and extra work.
- f. Should Contractor claim that any instruction, request, drawing, specification, action, condition, omission, default, or other situation (i) obligates the County to pay additional compensation to the Contractor; or (ii) obligates the County to grant an extension of time for the completion of the Contract; or (iii) constitutes a waiver of any provision in the Contract, CONTRACTOR SHALL NOTIFY THE COUNTY, IN WRITING, OF SUCH CLAIM AS SOON AS POSSIBLE, BUT IN NO EVENT WITHIN MORE THAN FIVE (5) WORKING DAYS FROM THE DATE CONTRACTOR HAS ACTUAL OR CONSTRUCTIVE NOTICE OF THE CLAIM. CONTRACTOR SHALL ALSO PROVIDE COUNTY WITH SUFFICIENT WRITTEN DOCUMENTATION SUPPORTING THE FACTUAL BASIS OF THE CLAIM including in the documentation items D (3) a-j described in this Article 47 above. Contractor shall be required to certify under penalty of perjury the validity and accuracy of any claims submitted. The Contractor's failure to notify the County within such five (5) working day period shall be deemed a waiver and relinquishment of the claim against the County. If such notice be given within the specified time, the procedure for its consideration shall be as stated above in this Article.
- g. All costs associated with the change are to be included in the change order proposal to the Construction Manager. Costs may be in terms of time, money or both.
- h. Overhead and Profit. The term "overhead and profit" for the Contractor and any subcontractors shall be considered to include: insurance, other than mentioned in Article 47(d) above, field and office supervisors and assistants, watchman, use of small tools, consumables, and general field and home office expenses, and no separate allowance will be made therefor.

ARTICLE 48. DEDUCTIONS FOR UNCORRECTED WORK

If the County in consultation with the Construction Manager and Architect deems it inexpedient to correct work injured or not done in accordance with the Contract, an equitable deduction from the Contract Price shall be made therefor.

ARTICLE 49. PAYMENTS BY CONTRACTOR

Contractor shall pay:

- a. For all transportation and utility services not later than the 20th day of the calendar month following that in which such services are rendered,
- b. For all materials, tools, and other expendable equipment to the extent of ninety five percent (95%) of cost thereof, not later than the 20th day of the calendar month following that in which such materials, tools, and equipment are delivered at site of Project and balance of cost thereof not later than the 30th day following completion of that part of work in or on which such materials, tools, and equipment are incorporated or used, and
- c. To each of his subcontractors, not later than the 7th day following each payment to Contractor, the respective amounts allowed Contractor on account of work performed by respective subcontractor to the extent of such subcontractor's interest therein.

ARTICLE 50. CONTRACTOR'S SUPERVISION

- a. Unless personally present on the premises where work is being done, Contractor shall keep on the work, during its progress, a competent full-time job (project) superintendent satisfactory to the County's Construction Manager. The job superintendent shall not be changed except with consent of the County unless the job superintendent proves to be unsatisfactory to Contractor and ceases to be in his employ. The job superintendent shall represent Contractor in his absence and all directions given to him shall be as binding as if given to Contractor. Other directions shall be so confirmed on written request in each case.

- b. Contractor shall give efficient supervision to work, using his best skill and attention to control safety and job coordination. He shall carefully study and compare all drawings, specifications, and other instructions and shall at once report to the Construction Manager of any error, inconsistency, or omission which he may discover.

ARTICLE 51. COUNTY'S INSPECTOR

- a. One or more Inspectors employed by County in accordance with requirements of Title 19, 21 and/or 24 of the California Code of Regulations will be assigned to the work. His duties are specifically defined in the California Code of Regulations.
- b. Inspector shall have access to all plant operations involving work under this Contract and shall be provided reasonable advance notice of the time and place of operations which the Inspector desires to observe. Inspector shall be provided with all necessary samples of materials and work for testing purposes. All work shall be under the observation of said Inspector. He shall have free access to any or all parts of work at any time. Contractor shall furnish Inspector reasonable facilities for obtaining such information as may be necessary to keep him fully informed respecting progress and manner of work and character of materials. Inspection of work shall not relieve Contractor from any obligation to fulfill this Contract. Inspector, after consultation with the Construction Manager and Architect, together, shall have authority to stop work whenever the provisions of the Contract Documents are not being complied with and Contractor shall instruct his employees accordingly.

ARTICLE 52. INSPECTOR'S FIELD OFFICE

- a. Provide and maintain prefabricated or mobile unit or similar job-built construction with lockable entrances, operable windows, and serviceable finishes. Inspector field office shall be at least 200 sq.ft. with at least one window and one entrance door with steps and 1 (one) ramp, entry platform, and cylinder locks and four keys. Door locks shall include a deadbolt type. All windows shall be provided with security bars (no wire mesh or metal screen).
- b. General Requirements:
 - 1. Tile floor
 - 2. Operable screened windows and shades
 - 3. Adequate lighting – interior and exterior at door.
 - 4. Adequate electrical outlets
 - 5. Heating, ventilating and air conditioning equipment in operable condition.
 - 6. Bi-weekly deliveries of purified bottled water in adequate quantities.
 - 7. One (1) multifunction machine with the following capabilities: network color print, copying, scanning, faxing, auto feed, sort, group, staple enlarge and reduce documents, with copy size capability of 11"x17".
- c. Furniture and Equipment:
 - 1. One desk, minimum 32 x 66 inches
 - 2. One desk adjustable chair
 - 3. Plan table
 - 4. High speed internet access
- d. Temporary Toilet Unit: Provide self-contained, single-occupant toilet unit of the chemical aerated recirculation, or combustion type. Provide hand wash station. Provide unit properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material. Chemical toilets are to be cleaned twice per week.

ARTICLE 53. DOCUMENTS ON WORK

- a. Contractor shall keep one copy of all Contract Documents, including addenda, change orders, Division I, Title 21 of the California Code of Regulations (Building Standards Administrative Code), Title 24 of the California Code of Regulations, and the prevailing wage rates applicable at the time of the Contract, the Uniform Building Code and any other laws, rules or regulations governing building standards for public construction, which by this reference is a part of the Contract Documents, on job at all times. Said documents shall be kept in good order and available to both the Construction Manager and the Architect and their representatives. Contractor shall be acquainted with and comply with the provisions of said these laws, rules or regulations as they relate to this Project. Contractor shall also be acquainted with and comply with all California Code of Regulations provisions relating to this Project, particularly Titles 19, 21 and 24 of the California Code of Regulations.
- b. Contractor shall also make available all books, records, accounts, contracts, bids, etc. upon request of the County.

ARTICLE 54. RECORD ("AS BUILT") DRAWINGS

- a. Contractor shall maintain a clean, undamaged set of contract drawings and shop drawings. In addition to maintaining one complete set of record drawings (herein referred to as "asbuilts"), Contractor shall require each trade to do its own as-builts. The trade as-builts shall contain information showing clean and clear drawings with horizontal and vertical controls suitable for conversion to electronic media. Graphic quality must be equal to clean and clear original drawings. Adequacy of the drawings shall be determined by the County's representative or architect. Contractor shall mark the set to show the actual installation where the installation varies from the work as originally shown. Contractor shall mark whichever drawings are most capable of showing conditions fully and accurately where shop drawings are used, record a cross-reference at the corresponding location on the contract drawings. Contractor shall give particular attention to concealed elements that would be difficult to measure and record at a later date. Contractor shall use colors to distinguish variations in separate categories of the work.
- b. Contractor shall note related change order numbers where applicable. Contractor shall organize record drawings sheets into manageable sets, bound with durable paper cover sheets and shall print suitable title, dates and other identification on the cover of each set.
- c. At the end of the Project, the Contractor shall provide the County Representative with a complete set of as-built drawings. The complete set shall contain information showing clean and clear drawings with horizontal and vertical controls suitable for conversion to electronic media. Graphic quality must be equal to clean and clear original drawings; adequacy of the drawings shall be determined by the County's representative or architect. The as-builts must show the entire site for each major trade, including but not limited to water, sewer, electrical, data, telephone, cable, fire alarm, gas and plumbing.

ARTICLE 55. UTILITY USAGE

- a. All temporary utilities, including but not limited to electricity, water, gas, and telephone used on work shall be furnished and paid for by Contractor. Contractor shall furnish and install necessary temporary distribution systems, including meters, if necessary, from distribution points to points on site where utility is necessary to carry on the work. Upon completion of work, Contractor shall remove all temporary distribution systems.
- b. Contractor shall provide necessary and adequate utilities and pay all costs for water, electricity, gas, oil, and sewer charges required for completion of the Project.
- c. All permanent meters installed shall be listed in the Contractor's name until completion occurs, as defined in Article 7 hereof, at which time further pro-rating will be determined if necessary. When the County begins using the Project, charges over and above power actually used for construction will be the responsibility of the County.
- d. If the Contract is for construction in existing facilities, Contractor may, with written permission of the County, use the County's existing utilities by making prearranged payments to the County for utilities used by Contractor for construction.

ARTICLE 56. SANITARY FACILITIES

Contractor shall provide sanitary temporary toilet buildings for the use of all workers, as directed by the Construction Manager. All toilets shall comply with local codes and ordinances. Toilets shall be kept supplied with toilet paper and shall have workable door fasteners. Toilets shall be serviced no less than once weekly and shall be present in a quantity of not less than 1 per 20 workers as required by CAL-OSHA regulation. The building shall be maintained in a sanitary condition at all times and shall be left at the site until the Inspector directs removal. Use of toilet facilities in the work under construction shall not be permitted except by approval of the Construction Manager.

ARTICLE 57. TRENCHES

- a. Trenches Five Feet or More in Depth. The Contractor shall submit to the County's Construction, for acceptance, in advance of excavation, 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 feet or more in depth. The plan shall be prepared by a registered civil or structural engineer. As part of the plan, a note shall be included stating that the registered civil or structural engineer certifies that the plan complies with CAL-OSHA Construction Safety Orders or stating that the registered civil or structural engineer certifies that the plan is not less effective than the shoring, bracing, sloping, or other provisions of the Safety Orders.
 - 1) All shoring submittals shall include surcharge loads from adjacent embankments, construction loads and spoil bank. Submittal shall indicate minimum horizontal distance from top of trench to edge of all surcharge loads for all cases of shoring and side slopes.
 - 2) Nothing in this Article shall relieve Contractor of the full responsibility for providing shoring, bracing sloping, or other provisions adequate for worker protection. If such plan varies from the shoring system standards established by the Construction Safety Orders, the plan shall be prepared by a registered

civil or structural engineer. No excavation of such trench or trenches shall be commenced until said plan has been accepted by the County or the person to whom authority to accept has been delegated by the County.

- b. Excavations Deeper than Four Feet. If work under this Contract involves digging trenches or other excavation that extends deeper than four feet below the surface, Contractor shall promptly, and before the following conditions are disturbed, notify the County's Construction Manager, in writing, of any:
- 1) Material that the Contractor believes may be material that is hazardous waste, as defined in Section 25117 of the Health and Safety Code that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law.
 - 2) Subsurface or latent physical conditions at the site differing from those indicated.
 - 3) Unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract. County or County's Representatives shall promptly investigate the conditions, and if it finds that the conditions do so materially differ, or do involve hazardous waste, and cause a decrease or increase in Contractor's cost of, or the time required for, performance of any part of the work, shall issue a change order under the procedures described in the Contract. In the event that a dispute arises between the County or County's Representative and the Contractor as to whether the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in the Contractor's cost of, or time required for, performance of any part of the work, the Contractor shall not be excused from any scheduled completion date provided for by the Contract, but shall proceed with all work to be performed under the Contract. Contractor shall retain any and all rights provided either by contract or by law which pertain to the resolution of disputes and protests between the parties.

ARTICLE 58. REGIONAL NOTIFICATION CENTER - EXCAVATIONS

- a. Contractor, except in an emergency, shall contact the appropriate regional notification center at least two working days prior to commencing any excavation if the excavation will be conducted in an area or in a private easement which is known, or reasonably should be known, to contain subsurface installations other than the underground facilities owned or operated by the County, and obtain an inquiry identification number from that notification center. No excavation shall be commenced and carried out by the Contractor unless such an inquiry identification number has been assigned to the Contractor or any subcontractor of the Contractor and the County or the County's Representatives has been given the identification number by the Contractor.
- b. Emergency shall be defined as a sudden, unexpected occurrence, involving a clear and imminent danger, demanding immediate action to prevent or mitigate loss of, or damage to, life, health, property, or essential public services. Emergency includes such occurrences as fire, flood, earthquake, or other soil or geologic movements, as well as such occurrences as riot, accident, or sabotage (Government Code Section 4216).
- c. Subsurface installation means any underground pipeline, conduit, duct, wire, or other structure operated or maintained in or across a public street or public right of way (Government Code Section 4216).

ARTICLE 59. PROTECTION OF WORK AND PROPERTY

- a. The Contractor shall be responsible for all damages to persons or property that occurs as a result of his fault or negligence in connection with the prosecution of this Contract. Contractor shall be responsible for the proper care and protection of all materials delivered and work performed until completion and final acceptance by the County. All work shall be solely at the Contractor's risk. Contractor shall adequately protect adjacent property from settlement or loss of lateral support as provided by law and the Contract Documents. Contractor shall take all necessary precautions for the safety of employees on the Project and shall comply with all applicable safety laws and building codes to prevent accidents or injury to persons on, about, or adjacent to premises where work is being performed. Contractor shall erect and properly maintain at all times, as required by conditions and progress of work, all necessary safeguards, signs, barriers, lights, and watchmen for protection of workers and the public and shall post danger signs warning against hazards created by such features in the course of construction. Contractor shall designate a responsible member of his organization on the work, whose duty shall be prevention of accidents. The name and position of the person so designated shall be reported to the County's Construction Manager by Contractor.
- b. In an emergency affecting safety of life or of work or of adjoining property, Contractor, without special instruction or authorization from either the Construction Manager, or the County, is hereby permitted to act, at his discretion, to prevent such threatened loss or injury, and he shall so act, without appeal, if so authorized or instructed by the Construction Manager or the County. Any compensation claimed by Contractor on account of emergency work shall be determined by agreement.
- c. Contractor shall provide such heat, covering, and enclosures as are necessary to protect all work, materials, equipment, appliances, and tools against damage by weather conditions.

- d. Contractor shall take adequate precautions to protect existing sidewalks, curbs, pavements, utilities, adjoining property, and structures, and to avoid damage thereto, and repair any damage thereto caused by construction operations. Contractor shall:
- 1) Enclose working area with a substantial barricade, arrange work to cause minimum amount of inconvenience and danger to the public.
 - 2) Provide substantial barricades around any shrubs or trees indicated to be preserved.
 - 3) Deliver materials to the building area over a route designated by both the Construction Manager and the Architect.
 - 4) When directed by the County, take preventive measures to eliminate objectionable dust and follow applicable Air Quality Management District air quality regulations as appropriate.
 - 5) Confine Contractor's apparatus, the storage of materials, and the operations of his workers to limits indicated by law, ordinances, permits, or directions of the Construction Manager. Contractor shall not unreasonably encumber premises with his materials. Contractor shall enforce all instructions of the County's Construction Manager regarding signs, advertising, fires, danger signals, barricades, and smoking and require that all persons employed on work comply with all regulations while on construction site.
 - 6) Take care to prevent disturbing or covering any survey markers, monuments, or other devices marking property boundaries or corners. If such markers are disturbed by accident, they shall be replaced by an approved civil engineer or land surveyor, licensed in the State of California, at no cost to the County.

ARTICLE 60. LAYOUT AND FIELD ENGINEERING

All field engineering required for laying out this work and establishing grades for earthwork operations shall be furnished by the Contractor at his expense. Such work shall be done by a qualified civil engineer approved by the Architect. Any required "as-built" drawings of site development shall be prepared by the approved civil engineer.

ARTICLE 61. REMOVAL OF HAZARDOUS MATERIALS

- a. Since removal and/or abatement of Asbestos, PCBs and other toxic wastes and hazardous materials is a specialized field of work with specialized insurance requirements, unless otherwise specified in the Contract Documents, the County shall contract directly for such specialized services, if required, and shall not require the Contractor to subcontract for such services.
- b. In the event the Contractor encounters on the site material reasonably believed to be asbestos or polychlorinated biphenyl (PCB) which has not been rendered harmless, the Contractor shall immediately stop work in the area affected and report the condition to the County's Inspector, and the Construction Manager in writing. The work in the affected area shall not thereafter be resumed except by written agreement of the County and Contractor if in fact the material is asbestos or PCB and has not been rendered harmless. The work in the affected area shall be resumed in the absence of asbestos or PCB, or when it has been rendered harmless, by written agreement of the County and Contractor, or by arbitration under Article hereof.

ARTICLE 62. CUTTING AND PATCHING

- a. Contractor shall do all cutting, fitting, or patching of work as required to make its several parts come together properly and fit it to receive or be received by work of other contractors showing upon, or reasonably implied by, the drawings and specifications for the completed structure. Contractor shall make good after them as the Construction may direct.
- b. All cost caused by defective or ill-timed work shall be borne by party responsible therefor.
- c. Contractor shall not endanger any work by cutting, excavating, or otherwise altering work and shall not cut or alter work of any other contractor save with written consent of the Architect.

ARTICLE 63. CLEANING UP

- a. Contractor at all times shall keep premises free from debris such as waste, rubbish, and excess materials and equipment caused by this work. Contractor shall not leave debris under, in, or about the premises. Upon completion of work, Contractor shall clean the interior and exterior of the building or improvement including fixtures, equipment, walls, floors, ceilings, roofs, windowsills and ledges, horizontal projections, and any areas where debris has collected so surfaces are free from foreign material or discoloration. Contractor shall clean and polish all glass, plumbing fixtures, and finish hardware and similar finish surfaces and equipment and Contractor shall also remove temporary fencing, barricades, planking and construction toilet and similar temporary facilities from site. Contractor shall also clean all buildings, asphalt, and concrete areas to the degree necessary to remove oil, grease, fuel, or other stains caused by Contractor operations or equipment.

- b. If the Contractor fails to clean up at the completion of the Work, the County may do so and the cost of such clean up shall be charged back to the Contractor.

ARTICLE 64. CORRECTION OF WORK BEFORE FINAL PAYMENT

- a. Contractor shall promptly remove from the premises all work condemned by the County as failing to conform to the Contract, whether incorporated or not. Contractor shall promptly replace and re-execute his own work to comply with the Contract Documents without additional expense to the County and shall bear the expense of making good all work of other contractors destroyed or damaged by such removal or replacement.
- b. If Contractor does not remove such condemned work within a reasonable time, fixed by written notice, the County may remove it and may store the material at Contractor's expense. If Contractor does not pay expenses of such removal within ten (10) calendar days' time thereafter, the County may, upon ten (10) calendar days' written notice, sell such materials at auction or at private sale and shall account for net proceeds thereof, after deducting all costs and expenses that should have been borne by Contractor.

ARTICLE 65. ACCESS TO WORK

The County and its Representatives shall at all times have access to work wherever it is in preparation or progress. Contractor shall provide safe and proper facilities for such access so that The County's Representatives may perform their functions under contract.

ARTICLE 66. OCCUPANCY

The County reserves the right to occupy the building at any time before completion, and such occupancy shall not constitute final acceptance of any part of work covered by this Contract.

ARTICLE 67. TESTS AND INSPECTIONS

- a. If the Contract, the County's construction manager's, architects, instructions, laws, ordinances, or any public authority require any work to be specially tested or approved, Contractor shall give notice in accordance with such authority of its readiness for observation or inspection at least two (2) working days prior to being tested or covered up. If inspection is by a public authority other than the County, Contractor shall inform the County's Construction Manager of date fixed for such inspection. Required certificates of inspection shall be secured by Contractor. Observations by the County, Construction Manager, Architect, or Inspector shall be promptly made and where practicable at source of supply. If any work should be covered up without approval or consent of the County, Construction Manager and/or Architect, it must, if required by the County's Construction Manager, be uncovered for examination and satisfactorily reconstructed at Contractor's expense in compliance with the Contract. Costs of tests of any materials found not to be in compliance with the Contract shall be paid by the Contractor.
- b. Where such inspection and testing are to be conducted by an independent laboratory or agency, such materials or samples of materials to be tested shall be selected by such laboratory or agency, or the County's representative, and not by Contractor. All test or inspections of materials shall be made in accordance with the commonly recognized standards of national organizations.
- c. In advance of manufacture of materials to be supplied by Contractor under the Contract, which by the terms of the Contract must be tested, Contractor shall notify the County's Construction Manager in advance so that the County and its Representatives may arrange for testing of same at the source of supply. Any materials shipped by Contractor from the source of supply prior to having satisfactorily passed such testing and inspection, or prior to receipt of notice from the County's Representative that such testing and inspection will not be required, shall not be incorporated into the work without the prior approval of the County or its Representatives and subsequent testing and inspection.
- d. Reexamination of questioned work may be ordered by the County or its Representatives. If so ordered, work must be uncovered by Contractor. If such work is found to be in accordance with the Contract Documents, the County shall pay the costs of reexamination and replacement. If such work be found not to be in accordance with the Contract Documents, Contractor shall pay such costs.

ARTICLE 68. SOILS INVESTIGATIONS

When a soils investigation report obtained from test holes at the site is available, such report shall not be a part of this Contract. Any information obtained from such report or any information given on drawings as to subsurface soil condition or to elevations of existing grades or elevations of underlying rock is approximate only, is not guaranteed, and does not form a part of the Contract. Contractor is required to make a visual examination of site and must make whatever tests he deems appropriate to determine the underground condition of the soil. Contractor agrees that he will make no claim against the County for damages in the event that during the progress of the work Contractor encounters subsurface or latent conditions at the site materially differing from those shown on drawings or indicated in specifications, or for unknown conditions of an unusual nature which differ materially from those ordinarily encountered and generally recognized as inherent in the work of the character provided for in plans and specifications.

ARTICLE 69. CONSTRUCTION MANAGER'S AND ARCHITECT'S STATUS

- a. Both the Architect and the Construction Manager shall be the County's representatives during the construction period, and shall have the responsibilities and authorities to act on behalf of the County only to the extent identified in the Contract Documents, and generally as follows:
 - 1) The Architect is responsible for: Interpreting the approved plans and specifications and providing any necessary amplification of the plans and specifications. Observing the construction and, in the first instance, judging the Contractor's performance with respect to the quality standards for materials and work in place. Accepting and approving decisions and clarifications, pertaining to the technical aspects of the Contract Documents.
 - 2) The Construction Manager is responsible for: Serving as the Contractor's point of contact for management and administration of the Contract and coordination of interfaces with other Contractors and organizations participating in the same or adjacent projects, as well as those of the Architect and Inspector. Implementing the established procedures for processing all required submissions and documentation. Monitoring and reviewing the Contractor's safety program, personnel and equipment, scheduling and progress of the work, and, without assuming any of the Architect's legal responsibilities, the work of the Contractor for conformance with the Contract Documents.
- b. The Construction Manager shall have authority to direct stoppage of the work whenever such stoppage may be necessary in the Construction Manager's, the Architect's, or Inspector's reasonable opinion to insure the proper execution of the Contract.
- c. The County retains the authority to issue the ultimate decision in the event the Construction Manager and Architect cannot reach a consensus regarding any decisions, clarifications, instructions, directions, acceptances, or approvals required, issues, or made pursuant to the Contract Documents and in connection with the prosecution and progress of the Work.

ARTICLE 70. DECISIONS OF CONSTRUCTION MANAGER AND ARCHITECT

Contractor shall promptly notify the County in writing if either the Construction Manager or Architect fail within a reasonable time, make decisions on all claims of the County or Contractor and on all other matters relating to the execution and progress of the work.

ARTICLE 71. PROVISIONS REQUIRED BY LAW DEEMED INSERTED

Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon application of either party, the Contract shall forthwith be physically amended to make such insertion or correction.

ARTICLE 72. LABOR/EMPLOYMENT SAFETY

The Contractor shall maintain emergency first aid treatment for his employees which complies with the Federal Occupational Safety and Health Act of 1970 (29 USC, Section 651 et seq.), and California Code of Regulations, Title 8, Industrial Relations Division 1, Department of Industrial Relations, Chapter 4.

ARTICLE 73. ASSIGNMENT OF ANTITRUST ACTIONS

Pursuant to Section 7103.5 of the Public Contract Code, in entering into a public works contract or subcontract to supply goods, services, or materials pursuant to a public works contract, Contractor or subcontractor offers and agrees to assign to the County all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 USC, Section 15) or under the Cartwright Act (chapter 2 (commencing with Section 16700) of part 2 of division 7 of the Business and Professions Code), arising from the purchase of goods, services, or materials pursuant to this Contract or any subcontract. This assignment shall be made and become effective at the time the County tenders final payment to the Contractor, without further acknowledgment by the parties.

ARTICLE 74. NOTICE OF THIRD-PARTY CLAIMS

Pursuant to Public Contract Code Section 9201, the County shall provide Contractor with timely notification of the receipt of any third-party claim, relating to the Contract. County is entitled to recover its reasonable costs incurred in providing such notification.

ARTICLE 75. SUBSTITUTION OF SECURITY

In accordance with Public Contract Code Section 22300, the County will permit the substitution of securities for any moneys withheld by the County to ensure performance under the Contract. At the request and expense of the Contractor, securities equivalent to the amount withheld shall be deposited with the County, or with a state or federally chartered bank as the escrow agent, who shall then pay such moneys to the Contractor. Upon satisfactory completion of the Contract, the securities shall be returned to the Contractor.

ARTICLE 76. COMPLIANCE WITH STATE STORM WATER PERMIT FOR CONSTRUCTION

- a. Contractor shall be required to comply with all conditions of the State Water Resources Control Board (State Water Board) National Pollutant Discharge Elimination System General Permit for Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction Activity (Permit) for all construction activity which results in the disturbance of in excess of one acre of total land area or which is part of a larger common area of development or sale. Contractor shall be responsible for filing the Notice of Intent and for obtaining the Permit. Contractor shall be solely responsible for preparing and implementing a Storm Water Pollution Prevention Plan (SWPPP) prior to initiating Work. In bidding on this Contract, it shall be Contractor's responsibility to evaluate the cost of procuring the Permit and preparing the SWPPP as well as complying with the SWPPP and any necessary revision to the SWPPP. Contractor shall comply with all requirements of the State Water Resources Control Board. Contractor shall include all costs of compliance with specified requirements in the contract amount.
- b. Contractor shall be responsible for procuring, implementing, and complying with the provisions of the Permit and the SWPPP, including the standard provisions, monitoring and reporting requirements as required by the Permit. Contractor shall provide copies of all reports and monitoring information to the County's Construction Manager.
- c. Contractor shall comply with the lawful requirements of any applicable municipality, the County, drainage County, and other local agencies regarding discharges of storm water to separate storm drain system or other watercourses under their jurisdiction, including applicable requirements in municipal storm water management programs.
- d. Failure to comply with the Permit is in violation of federal and state law. Contractor hereby agrees to indemnify and hold harmless County, its Board members, officers, agents, employees and authorized volunteers from and against any and all claims, demands, losses or liabilities of any kind or nature which County, its Board members, officers, agents, employees and authorized volunteers may sustain or incur for noncompliance with the Permit arising out of or in connection with the Project, except for liability resulting from the sole established negligence, willful misconduct or active negligence of the County, its Board members, officers, agents, employees or authorized volunteers. County may seek damages from Contractor for delay in completing the Contract in accordance with Article 6 hereof, caused by Contractor's failure to comply with Permit.

ARTICLE 77. RESOLUTION OF CONSTRUCTION CLAIMS

- a. The following shall be applicable to all Claims:
 - 1) Definition of Claim: A "Claim" means a separate demand by the Contractor for (a) time extension, (b) payment of money or damages arising from work done by or on behalf of the Contractor pursuant to the Contract and payment of which is not otherwise expressly provided for or the claimant is not otherwise entitled to, or (c) an amount the payment of which is disputed by the County.
 - 2) Filing Claim is Not Basis To Discontinue Work: The Contractor shall promptly comply with work under the Contract or work requested by the County even though a written claim has been filed. The Contractor and the County shall make good faith efforts to resolve any and all claims that may arise during the performance of the work covered by this Contract.
- b. Procedure for Claims \$375,000 and Under:
 - 1) Any formal claim of \$375,000 and under shall be processed as follows in accordance with Public Contract Code Section 20104 et. seq.:
 - (a) Claims less than \$50,000. For claims less than Fifty Thousand Dollars (\$50,000.00), the County shall respond in writing to any written claim within forty-five (45) days of receipt of the claim, or may request, in writing, within thirty (30) days of receipt of the claim, any additional documentation supporting the claim or relating to defenses to the claim that the County may have against the Contractor. If additional information is thereafter required, it shall be requested and provided upon mutual agreement of the County and the Contractor. The written response of the County to the claim, as further documented, shall be submitted to Contractor within fifteen (15) days after receipt of the further documentation or within a period of time no greater than that taken by Contractor in producing the additional information, whichever is greater.
 - (b) Claims in Excess of \$50,000. For claims over Fifty Thousand Dollars (\$50,000.00), and less than or equal to Three Hundred Seventy-five Thousand Dollars (\$375,000.00), the County shall respond in writing to all written claims within sixty (60) days of receipt of the claim, or may request, in writing, within thirty (30) days of receipt of the claim, any additional documentation supporting the claim or relating to defenses to the claim that the County may have against the Contractor. If additional information is thereafter required, it shall be

requested and provided by mutual agreement of the County and the Contractor. The written response of the County to the claim, as further documented, shall be submitted to the Contractor within thirty (30) days after receipt of the further documentation, or within a period of time no greater than that taken by Contractor in producing the additional information or requested documentation, whichever is greater.

- 2) Informal Meet and Confer Conference: If Contractor disputes the written response of the County, or the County fails to respond within the time prescribed, Contractor may so notify the County, in writing, either within fifteen (15) days of receipt of the County's response or within fifteen (15) days of the failure of the County to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon a demand, the County shall schedule a meet and confer conference within thirty (30) days for settlement of the dispute.
- 3) Tort Claim: If following the meet and confer conference the claim or any portion remains in dispute, the claimant may file a claim pursuant to Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of the Title 1 of the Government Code. For purposes of that provision, the running of the period of time within which a claim must be filed shall be tolled from the time the claimant submits his/her written claim until the time the claim is denied, including any period of time utilized by the meet and conference.

c. Procedures for Civil Actions to Resolve Disputed Claims:

- 1) Non-binding Mediation: Within sixty (60) days, but no earlier than thirty (30) days, following the filing of a responsive pleading, the court shall submit the matter to non-binding mediation unless waived by mutual stipulation by both parties. The mediation process shall provide for the selection within fifteen (15) days by both parties of a disinterested third person as mediator, shall be commenced within thirty (30) days of the submittal, and shall be concluded within fifteen (15) days from the commencement of the mediation unless a time requirement is extended upon a good cause shown to the court. If the parties fail to select a mediator within the 15-day period, any party may petition the court to appoint the mediator.
- 2) Judicial Arbitration: If the matter remains in dispute, the case shall be submitted to judicial arbitration pursuant to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, notwithstanding Section 1141.11 of the code. The Civil Discovery Act of 1986 (Article 3 (commencing with Section 2016) of Chapter 3 of Title 3 of Part 4 of the Code of Civil Procedure) shall apply to any proceeding brought under this subsection consistent with the rules pertaining to judicial arbitration. Arbitrators shall be experienced in construction law.
- 3) Appeals: In addition to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of the Code of Civil Procedure), any party appealing an arbitration award who does not obtain a more favorable judgment shall, in addition to payment of costs and fees, also pay the attorneys' fees on appeal of the other party.
- 4) Interest: In any suit filed pursuant to Public Contract Code Section 20104.4, the County shall pay interest at the legal rate on any arbitration award or judgment. The interest shall begin to accrue on the date the suit is filed in the court of law.

d. Procedure for Claims Over \$375,000:

- 1) If a dispute in excess of a total value of \$375,000, arises out of, or relates to this Contract, or the breach thereof, and if said dispute cannot be settled through normal contract negotiations, the parties agree that as a condition precedent to the initiation of litigation, the dispute shall first be submitted to mediation pursuant to this Article 80. The mediation is voluntary, non-binding, and intended to provide an opportunity for the parties to evaluate each other's cases and arrive at a mutually agreeable resolution of the dispute. These provisions relating to voluntary mediation shall not be construed or interpreted as mandatory arbitration.
- 2) Either party may initiate mediation by notifying the other party or parties in writing. A Request for Mediation shall contain a brief statement of the nature of the dispute or claim, and the names, addresses, and phone numbers of all parties to the dispute or claim, and those, if any, who will represent them in the mediation.
- 3) The mediation process set forth in this Article shall be administered by the American Arbitration Association (AAA) and governed by their rules in effect at the time of filing, or by any other neutral organization agreed to by the parties (hereinafter called "Administrator").
- 4) The costs for all mediation, including the administrative fees and mediator compensation, will be shared equally by all parties. Fees shall be jointly negotiated by all parties directly with the Administrator. If all parties agree, then the mediation costs may increase as required for resolution of

the dispute. The expenses of witnesses for a party shall be paid by the party producing such witnesses.

- 5) A single mediator, acceptable to all parties, shall be used to mediate the dispute. The mediator will be knowledgeable in construction matters and will be selected from lists furnished by the Administrator. The initial mediation session shall commence within thirty (30) days of filing, unless otherwise agreed by the parties, or at the direction of the mediator.
 - 6) At least then (10) days before the first scheduled mediation session, each party shall provide the mediator a brief memorandum setting forth its position with regard to the issues that need to be resolved. At the discretion of the mediator, such memoranda may be mutually exchanged by the parties. At the first session, the parties will be expected to produce all information reasonably required for the mediator to understand the issue presented. The mediator may require each party to supplement such information.
 - 7) Mediation hearings will be conducted in an informal manner and discovery will not be allowed unless agreed to by all parties. All discussions, statements, or admissions will be confidential to the proceedings and will not be used for any other purpose as they relate to either party's legal position. There shall be no stenographic record of the mediation.
 - 8) Mediation sessions are private. The parties and their representatives may attend mediation sessions. Other persons may attend only with the permission of the parties and with the consent of the mediator. The parties may have an attorney present and shall advise the other parties no less than five (5) working days before the mediation of their intent to have an attorney present, so that the other parties may also have their attorneys present.
 - 9) The mediator does not have authority to impose a settlement on the parties but will attempt to assist the parties in reaching a satisfactory resolution of their dispute. The mediator is authorized to conduct joint and separate meetings with the parties and to make oral and written recommendations for settlement. Whenever necessary, the mediator may also obtain expert advice concerning technical aspects of the dispute, provided the parties agree and assume the expenses of obtaining such advice. Arrangements for obtaining such advice shall be made by the mediator or the parties, as the mediator shall determine.
 - 10) The mediator is authorized to end the mediation whenever, in the mediator's judgment, further efforts at mediation would not contribute to a resolution of the dispute between the parties.
 - 11) Any resultant agreements from mediation shall be documented in writing, as agreed upon during the mediation, and may be used as the basis for a change order or other directive as appropriate. All mediation results and documentation shall be non-binding and inadmissible for any purpose in any legal proceedings, unless such admission is otherwise agreed in writing by all parties. Mediators shall not be subject to any subpoena or liability and their actions shall not be subject to discovery in subsequent proceedings.
 - 12) The Mediation shall be terminated by the execution of a Settlement Agreement by the parties; by a written declaration of the Mediator to the effect that further efforts at Mediation are no longer worthwhile; or by a written declaration of a party or parties to the effect that the Mediation proceedings are terminated.
 - 13) If mediation is unsuccessful in resolving the dispute, the parties thereafter may agree to submit the matter to the Administrator for binding arbitration. The parties agree that the matter shall be submitted to one (1) arbitrator unless they agree to three (3) arbitrators in writing. The parties further agree that they will faithfully observe this Contract, and that the parties will abide by and perform any award rendered by the arbitrator(s), that a judgment of a court having competent jurisdiction may be entered upon the award, and that such judgment shall be enforceable as a final judgment to the fullest extent under the law. The parties agree to split evenly all arbitration and arbitrator(s)' fees and expenses. The arbitration shall be subject to, and proceed in accordance with Code of Civil Procedure, Section 1280 through 1294.2 if the parties do not agree to submit to binding arbitration, neither party is prevented from pursuing other legal remedies.
 - 14) Any arbitration, mediation or other forms of alternate dispute resolution shall be handled within the boundaries of the County unless otherwise mutually agreed.
- e. Rights and Remedies. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto, and, in particular but without limitation, the warranties, guarantees and obligations imposed upon Contractor by the General Conditions and amendments thereto and all of the rights and remedies available to County and Construction Manager/Architect thereunder, are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by laws or regulations by special warranty or

guarantee or by other provisions of the Contract Documents, and the provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right and remedy to which they apply.

- f. **Arbitration Award.** Pursuant to Government Code Section 818, the Arbitrator shall have no jurisdiction to award punitive or exemplary damages.
- g. **Attorney's Fees and Costs.** In the event that any arbitration, action, suit or other proceeding is instituted to enforce any provision of this Contract, and/or to remedy, prevent, or obtain relief from a breach of this Contract, the prevailing party shall be entitled to recover all of its attorney's fees and costs incurred in each and every such arbitration, action, suit or other proceeding, including any and all appeals or petitions therefrom, except as may be provided to the contrary above. As used herein, attorney's fees shall be deemed to mean the full actual costs of any legal services actually performed in connection with the matters involved, calculated on the basis of the usual fees charged by the attorneys performing such services and shall not be limited to "reasonable attorney's fees" as defined by any statute or rule of court.

ARTICLE 78. INTEGRATION

- a. **Oral Modifications Ineffective.** No oral order, objection, claim or notice by any party to the other shall affect or modify any of the terms or obligations contained in any of the Contract Documents and none of the provisions of the Contract Documents shall be held to be waived or modified by reason of any act whatsoever, except by a waiver or modification thereof in writing and signed by the authorized representative of the County and the Contractor.
- b. **Contract Documents Represent Entire Contract.** The Contract Documents represent the entire understanding of the County and Contractor as to those matters contained therein, and no prior oral or written understanding shall be of any force or effect with respect to those matters covered by the Contract Documents.\

ARTICLE 79. COMPLIANCE WITH DTSC GUIDELINES—IMPORTED SOILS

If the Project requires the use of imported soils, the Contractor shall be responsible to use and shall certify that the imported material it uses is free of any hazardous and/or toxic substance or material of any nature or type as defined in accordance with California Law and the Health and Safety Code. The County reserves the right to reject any imported material that has come from agricultural or commercial land uses. Contractor must notify the County of the source of material and comply with any applicable Regional Water Quality Control Board Resolutions and when applicable, with the guidelines of the Department of Toxic Substances Control (DTSC).

ARTICLE 80. NOTICE OF TAXABLE POSSESSORY INTEREST

The terms of this document may result in the creation of a possessory interest. If such a possessory interest is vested in a private party to this document, the private party may be subjected to the payment of personal property taxes levied on such interest.

ARTICLE 81. MISCELLANEOUS

These Contract Documents shall be interpreted in accordance with the laws of the State of California. If any action is brought to interpret or enforce any term of these Contract Documents, the action shall be brought in a state or federal court situated in the County of Madera, State of California. Except as otherwise provided in these Contract Documents, in the event of any such litigation between the parties, the prevailing party shall be entitled to recover all reasonable costs incurred, including reasonable attorney's fees, as determined by the court.

END OF SECTION 00 72 13

SECTION 00 73 00
SUPPLEMENTARY CONDITIONS

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**SECTION 00 73 00
SUPPLEMENTARY CONDITIONS**

The following articles supersede the General Conditions as issued. When any article, paragraph or subparagraph is not modified or deleted by these Supplementary Conditions, the unaltered provisions of such Article, paragraph or subparagraph shall remain in effect.

ARTICLE SC-01 GENERAL

The Contractor will be provided, at Owner expense, with two (2) sets of plans and specifications. Additional plans and specifications may be obtained at the Contractor's expense and upon forty-eight (48) hour notice to the Architect.

ARTICLE SC-02 SPECIFICATIONS

- A. Where portions of these Specifications are written in imperative form, the imperative language is directed to the Contractor, unless specifically noted otherwise.
- B. Specification Paragraphs:
 - 1. Specification Paragraphs titled "Summary" or "Description of Work" is not intended to "scope" the Section nor imply a trade responsibility, but serve merely as a listing of significant items in the Section to allow the reader to quickly assess the Section content.
 - 2. Similarly, specification Paragraphs titled "Related Documents" are not intended to coordinate the Contractor's work, but merely indicate where certain other significant items which may be related to the work of the Section are indicated and/or specified.

ARTICLE SC-03 BUILDING PERMIT

Authority To Construct from San Joaquin Valley Air Pollution Control District will be obtained and paid for by the Owner. Building permit and other required permits are the responsibility of the Contractor. Reference the General Conditions.

ARTICLE SC-04 CODES AND REGULATIONS

All work, materials, and equipment shall be in full compliance with the California Building Code; California Plumbing Code; California Electrical Code; California Mechanical Code, California Fire Code, California Energy Code, with California Amendments, Cal/OSHA Safety Regulations; and all Federal, State and Local laws, ordinances, regulations, and Madera County Charter Provisions applicable in the performance of the work.

ARTICLE SC-05 UNDERGROUND SURVEY OF EXISTING UTILITIES

Prior to performing excavation activities, the Contractor shall contact Underground Service Alert (USA) 800-227-2600 and/or at their sole expense employ the services of a private locator to survey and ascertain the actual locations of existing underground utilities. Should the Contractor damage existing underground utilities during the prosecution of the work, they shall immediately notify the Architect in writing and diligently affect repairs to the damaged utility. The Contractor shall be responsible for all repairs and consequential damages resulting from utility outages cause as a result of the performance of their work.

ARTICLE SC-06 SCHEDULE OF OPERATION

- A. Time is of the essence in the performance of this Contract.
- B. The Owner shall issue to Contractor a Notice to Proceed designating the starting date on which Contractor shall begin work. The Contractor shall diligently prosecute the work from such date to completion within the time specified in the SUPPLEMENTARY CONDITIONS or any adjustments thereof.
- C. The Contractor shall not begin work in advance of receiving the Notice to Proceed.
- D. Construction activities shall be performed between the hours of 7:00 a.m. and 5:00 p.m., Monday through Friday. No work shall be performed outside the above hours without prior written authorization from the Owner.
- E. Construction activity that is disruptive to operations and adjoining spaces shall be minimized especially to all noise and vibration producing activities. Contractor shall plan to do disruptive work after normal business hours and shall coordinate and receive Owner approval prior to conducting work.

ARTICLE SC-07 CONTRACTOR COOPERATION

- A. Within the overall Project, the Contractor shall coordinate their work, as required, with the other contractors.
- B. The Contractor shall remove all debris, temporary facilities, or other items that may interfere with the other contractor's ability to perform their work.

ARTICLE SC-08 DAMAGE TO EXISTING WORK AND WORK OF OTHER CONTRACTORS

Damage to existing construction, equipment, planting, or to work of other contractors, by the Contractor in the performance of their work, shall be replaced or repaired and restored to original condition by the Contractor at the Contractor's expense.

ARTICLE SC-09 TRENCHING AND EXCAVATION

NOT APPLICABLE

ARTICLE SC-10 TRENCHES FIVE FEET OR MORE IN DEPTH

NOT APPLICABLE

ARTICLE SC-11 ABNORMAL WEATHER CONDITIONS

- A. The Contractor shall provide a Notice of Claim and a schedule fragnet submittal to the Architect for all time extension requests due to abnormal weather conditions. Should the Contractor fail to provide Notice of Claim and/or a schedule fragnet submittal for the weather event within the specified time limits, then it is mutually agreed that the weather event has no time impact on the contract completion date and no time extension is required. If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time and could not have been reasonably anticipated, and that weather conditions had an adverse effect on the scheduled construction as illustrated by a schedule fragnet.

A rain, windstorm, high water or other natural phenomenon of the specific locality of the work, which might reasonably have been anticipated from historical records of the general locality of the work, shall not be construed as abnormal weather conditions. The contractor shall anticipate the effect of the following rainfall totals provided by the Western Regional Climate Center during the development of the Project Schedule. No allowance for weather related contract time extensions will be considered until the following monthly totals have been surpassed and the adverse weather must have actually caused a delay in the completion of the project.

Avg. Total Precipitation (in.)/Month			
JAN	2.08	JUL	0.01
FEB	1.81	AUG	0.02
MAR	1.84	SEP	0.17
APR	1.13	OCT	0.62
MAY	0.44	NOV	1.30
JUN	0.10	DEC	1.71

After the anticipated adverse weather totals are exceeded, a contract time extension will be considered when adverse weather prevents work on critical activities for more than fifty percent (50%) of the scheduled workday. Upon experiencing critical path schedule impacts due to adverse weather conditions the Contractor shall seek a time extension in accordance with the Contract Modification Procedures.

ARTICLE SC-12 CERTIFICATES OF INSURANCE

- A. Before any Work commences at the Site, Contractor shall provide Owner with Certificates of Insurance, applicable endorsements, and Declarations pages for all insurance policies that Contractor and its Subcontractors are required to purchase and maintain.
 - 1. The Certificates of Insurance shall confirm (1) that respective affiliates, subsidiaries, directors, officers, partners, representatives, agents, and employees are insured under all required insurance policies (except professional liability and workers' compensation insurance policies) maintained by the Contractor and its Subcontractors, and (2) that the broker or agent issuing the Certificates is authorized by the insurance carrier to so represent.
 - 2. The Certificates of Insurance also shall evidence and attach copies of (1) the endorsements and other insurance requirements specified in the General Conditions, as modified by these Supplementary General Conditions, and (2) the Declarations page for each applicable policy.

3. Upon Owner's request, Contractor shall provide Owner with a complete copy of each insurance policy Contractor is required to purchase and maintain (including an explanation of any limitations or exclusions applicable to Owner as an "additional insured").
- C. If Contractor or its Subcontractors are required, by the General Conditions and these Supplementary General Conditions, to maintain insurance coverage beyond the expiration dates of the insurance policies indicated in any Certificates of Insurance provided to Owner, Contractor and its Subcontractors shall provide Owner with (a) written notice indicating replacement coverage for each expiring required insurance policy at least thirty (30) days prior to the expiration date of the applicable policy, and (b) within thirty (30) days after each new policy incepts, Contractor and its Subcontractors shall provide Owner with replacement Certificates of Insurance that evidence the required coverage, attach copies of required endorsements and Declarations pages, and otherwise comply with all insurance requirements contained in the General Conditions and these Supplementary General Conditions.
- D. Contractor's obligation to procure and maintain insurance (as specified in the General Conditions and these Supplementary General Conditions) are not, in any way, waived or excused by (1) Owner's failure to demand Certificates of Insurance, endorsements, or other evidence of Contractor or its Subcontractor's insurance coverage, (2) Owner's acceptance of Certificates of Insurance, endorsements, or other documents that do not fully comply with the insurance requirements, or (3) Owner's failure to identify a deficiency contained in the Certificates of Insurance, endorsements, or other evidence of insurance coverage provided by Contractor or its Subcontractor.
- E. By requiring such insurance and insurance limits herein, Owner does not represent that coverage and limits will necessarily be adequate to protect Contractor and such coverage and limits shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

ARTICLE SC-13 CONTRACTOR'S LIABILITY INSURANCE

- A. Contractor shall purchase and maintain, and shall cause each of its Subcontractors to purchase and maintain, such liability and other insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's or Subcontractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:
- B. The limits of liability for the insurance required by the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:
 1. Workers' Compensation, and related coverage under Article 25 of the General Conditions:

a. <u>Workers' Compensation</u> State: Labor Code b. <u>Employers' Liability</u> Each Accident: Disease - Policy Limit: Disease - Each Employee:	Amount required by the California <u>Minimum Limits</u> \$1,000,000 \$1,000,000 \$1,000,000
 2. General Liability Insurance under Article 27 of the General Conditions, shall include (1) broad form contractual liability coverage, (2) broad form property damage liability coverage, (3) personal injury coverage, (4) products liability and completed operations coverage, (5) cross-liability coverage, (6) premises and operations coverage and (7) independent contractors; and shall eliminate the exclusion with respect to property under the care, custody and control of Contractor:

a. <u>General Liability</u> General Aggregate: Products-Completed Operations: Personal & Advertising Injury: Each Occurrence (Bodily Injury and Property Damage): b. The General Liability coverage shall include an explosion, collapse and underground endorsement, including subsidence and any other earth movement ("XCU Coverage"). Owner's representative may waive XCU Coverage for Contractors which are not involved in excavation work.	<u>Minimum Limits</u> \$2,000,000 \$2,000,000 \$1,000,000 \$1,000,000

- c. The General Liability coverage, including completed operations coverage, must remain in effect through the applicable warranty period(s) and must include additional insured, as required herein.

3. The Contractual Liability coverage required by Article 27 of the General Conditions shall provide coverage for not less than the following amounts:

a.	Bodily Injury	Minimum Limits
	Each Accident	\$1,000,000
	Annual Aggregate	\$2,000,000
b.	Property Damage	Minimum Limits
	Each Accident	\$1,000,000
	Annual Aggregate	\$2,000,000

4. Automobile Liability under Article 28 of the General Conditions:

a.	<u>Automobile Liability</u>	<u>Minimum Limits</u>
	Company-owned Vehicles –	
	Combined Single Limit (any auto):	\$1,000,000
	Hired & Non-owned –	
	Combined Single Limit (any auto):	\$1,000,000
b.	Applicable to Hazardous Material Suppliers/Haulers: *	
	Company-owned Vehicles –	
	Combined Single Limit (any auto):	\$5,000,000
		(\$1,000,000 primary and \$4,000,000 in excess liability)

*Transporters Automobile Pollution & Remediation Legal Liability including coverage for loss, damage and cleanup costs caused by pollution arising from the transportation of hazardous materials by a covered automobile and arising out of the upset, overturn, collision, loading and unloading of materials.

5. Builder's Risk under Article 29 of the General Conditions:

a.	<u>Builder's Risk</u>	<u>Minimum Limits</u>
	Including Boiler and Machinery Coverage	Total Constructed Value
	Insuring All Risk of Physical Loss including	100% repair or replacement to full value of the
	property.	
	Flood, Earthquake and Windstorm (Tornado)	

6. The following additional requirements may be added, as appropriate to a specific contract:

a.	Professional Liability/Errors & Omissions	Minimum Limits
	Each Claim:	\$2,000,000
	Annual Aggregate:	\$2,000,000
b.	Contractor's Pollution Liability	Minimum Limits
	Each Claim:	\$5,000,000
	Annual Aggregate:	\$5,000,000

D. Each liability policy required to be carried by Contractor and its Subcontractors shall name the County, their respective affiliates, subsidiaries, directors, officers, partners, representatives, agents, and employees as additional insured under the policy. The additional insured status shall be confirmed by endorsements, which shall be supplied to Owner along with the Certificates of Insurance and copies of the Declarations page for each policy pursuant to Article 30 of the General Conditions.

ARTICLE SC-14 TIME OF COMPLETION

A. Anticipated Dates: The anticipated dates of events are set forth below and subject to change.

<u>EVENT DESCRIPTION</u>	<u>Anticipated Date</u>
1. Pre-Bid Conference	May 14, 2026 at 11:00am

2. Bid Date	June 10, 2026 by 3:00pm
3. Project Award	July 14, 2026
4. Notice to Proceed (NTP)	July 27, 2026

B. Time of Completion Madera County Riverstone Fire Station 14 Calendar Months from NTP

C. For each milestone, work shall be completed on or before the Finish-No-Later-Than time.

D. When work of a milestone is completed, Contractor shall request inspection. Within five (5) days of receipt of request, the Construction Manager shall make a milestone inspection.

E. If the Construction Manager determines that work of the milestone has been completed, the Construction Manager shall send a letter of certification to the Contractor. Such certification will not constitute acceptance but will establish conformity with the Contract for that portion of the Work included in the milestone subject to the following exceptions:

1. Delays in completion.
2. Latent defects.
3. Fraud, or such gross errors as amount to fraud.
4. Willful misconduct or gross negligence.
5. Subject to any guarantee or warranty, express or implied.

F. If the Construction Manager determines that the Work of the milestone is not complete, Contractor will be notified. Construction Manager shall issue a list of deficiencies; or a notice stating work of the Milestone is not sufficiently complete to be inspected with a listing of the significant deficiencies.

G. When work of the Milestone is completed, Contractor shall request another inspection.

H. Work of the Milestone is considered complete only upon the completion of all punch list work and deficiencies.

ARTICLE SC-15 LIQUIDATED DAMAGES

A. If, as determined by the Architect, work is not completed within the time specified or any adjustments thereof, damage will be sustained by the Owner. It is and will be extremely difficult and impracticable to determine the actual damage that the Owner will sustain by reason of such delay. Therefore, Contractor shall pay to Owner, as liquidated damages, the amount specified below. Owner may deduct liquidated damages from funds due or that become due to Contractor. Deductions for liquidated damages will be in addition to the five percent (5%) retention applied to progress payments.

B.

ARTICLE SC-16 CONTRACTOR'S WORKSITE STAFF

A. Contractor's worksite staff shall give personal attention to the work and keep work under control and in conformance with the Contract.

B. The Contractor shall maintain sufficient on-site personnel to effectively manage the work. The Contractor shall assign a minimum of four (4) different individuals, one (1) for each function, to be personally responsible for the following four (4) functions of work:

1. On-site project management (full-time or part-time)
2. On-site supervision of construction (full-time)
3. On-site engineering (part-time) Responsible for document control as needed for the project. Processes RFI's, submittals, daily reports, maintain as-built drawings, closeout documents, and other duties as required for the project. Supports Superintendent and Project Manager.
4. On-site scheduling (part-time as needed)

If in the opinion of the Architect, the work is not being effectively managed the Architect may order the Contractor to augment or replace specific staff as necessary to ensure the successful completion of the project. Such personnel changes shall be at the sole expense of the Contractor.

ARTICLE SC-17 TEMPORARY FACILITIES

- A. The Contractor shall submit a project logistics plan to the Architect for approval within **fourteen (14) calendar days** from the Notice to Proceed date. The logistics plan shall define how Contractor plans to control site processes including, but not limited to, means and methods to accommodate temporary utilities, temporary facilities, site traffic, off-site parking, material delivery and material storage, etc.
- B. At the Contractor's option they may utilize suitable off-site storage facilities and/or lay-down areas to store materials. Fees paid for such off-site storage facilities and all costs associated with transportation of materials to or from the site shall be at the sole expense of the Contractor.
 - 1. Material Deliveries shall be scheduled so as to cause minimal disruption of adjacent businesses and normal traffic patterns on streets abutting the site.
 - 2. Construction Parking: No construction vehicle parking is provided. The Contractor shall limit the number of vehicles allowed on site to those vehicles necessary to perform the Work. Construction.
- C. Construction operations shall be confined to the site. Operations that encroach onto the public right of way shall be scheduled and performed either after 6:00 p.m. or on weekends and must be approved by the Architect in advance of the planned work. Detours and road closures will not be permitted for such operations.
- E. The Contractor shall make allowances for the continued use of the existing Madera County facilities and ongoing County operations.

ARTICLE SC-18 COUNTY'S INSPECTOR

- A. It is anticipated that all inspections will go through Madera County Building Department. Inspections will be made as requested by the Contractor and as required by the Contract Documents. 48-hour notice is required for any inspections.

ARTICLE SC-19 PROJECT SIGNAGE

- A. Contractor shall be responsible to provide, install, and maintain all required project signage. The location and content of project signage must be approved by the Construction Manager prior to installation.
- B. Under no circumstances shall Contractor or any of their Subcontractors be allowed to install or otherwise display advertising or similar signage without the express written consent of the Construction Manager.

END OF SECTION 00 73 00

SECTION 01 04 20

COORDINATION DRAWINGS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Supplemental General Conditions and other Division 01 General Requirements, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Furnish all labor, materials and services for all coordination drawings as indicated, in accord with provisions of Contract Documents.
 - 2. Completely coordinate with work of all other trades.
 - 3. Although such work is not specifically indicated, furnish, and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.
- B. Coordination drawings: Produce and submit overlay drawings showing all horizontal and vertical dimensions for all underground utility work including vaults, utility work in and above ceilings, and in mechanical rooms. Avoid interference with structural framing, ceiling, partitions, and other services.
- C. Prior to start of work in any given area, each subcontractor shall approve, in writing, all coordination drawings affecting his/her work in that area.
- D. Any relocations required as a result of failure to resolve interferences, provide correct coordination drawings, or all attention to changes required in other work as a result of modifications to contract shall be paid for by the Contractor.
- E. Coordination meetings shall be scheduled by the General Contractor and coordinated with a Construction Manager.
- F. This Section of the Specifications is intended to ensure total coordination of all disciplines and is not intended to generally overlay drawings for all above ceiling areas. Areas of greatest complexity shall be addressed. Determination of areas to be addressed will be made with the Construction Manager during the scheduled coordination meetings. The selection of those specific areas to be addressed will not relieve the Contractor of coordination responsibility in all other areas of the facility.

1.03 PRODUCTION OF COORDINATION DRAWINGS

- A. General Contractor shall provide background drawings, showing partitions, ceiling heights, and structural framing locations and elevations, and existing obstructions.
- B. Resolve major interferences at initial coordination meeting prior to production of any drawings.

- C. Produce all initial coordination drawings within thirty (30) days after initial meeting. The General Contractor will arrange for production of said drawings not provided within that time.
- D. Meet as required to resolve interferences and correct coordination drawings.

1.04 AFTER APPROVAL

- A. After subcontractors' written approval of coordination drawings, mentioned used to resolve interferences not previously identified shall be determined by the General Contractor.
- B. All changes to approved coordination drawings approved in writing by the General Contractor prior to the start of work in the affected area.

1.05 PRECEDENCE OF SERVICES

- A. In event of conflicts involving location and layout of the work following priority will be used to resolve disputes. Structure has the highest priority:
 - 1. Structure
 - 2. Ceiling grid/tile/light fixtures.
 - 3. Gravity drainage lines.
 - 4. Large pipe mains.
 - 5. Ductwork/diffusers, registers and grilles.
 - 6. Sprinkler heads.
 - 7. Small piping and tubing/electrical conduit.
 - 8. Access panels.

1.06 SUBMITTALS

- A. See Section 01 33 00 for number and manner of submittals.

PART 2 - PRODUCTS (not used)

PART 3 – EXECUTION (not used)

END OF SECTION 01 04 20

SECTION 01 11 00

SUMMARY OF WORK

PART 1 – GENERAL

1.01 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General Conditions and Supplemental General Conditions and other Division 01 General Requirements, apply to this Section.

1.02 PROJECT DESCRIPTION:

- A. The Project Name: Madera County Riverstone Fire Station
- B. Project Location: Intersection of Avenue 12 and Road 40 (36°54'43.1"N 119°49'17.8"W).
- C. Owner: The County of Madera County, 200 W. Fourth Street, Madera, CA93637
- D. Architect: RRM Design Group, 3765 S. Higuera St., Suite 102, San Luis Obispo, CA 93401.
- E. Construction Manager: Kitchell CEM, 2300 Tulare Street, Suite 100, Fresno, California, has been engaged as Construction Manager for this Project to serve as an advisor to Owner and to provide assistance in administering the Contract for Construction between Owner and Contractor, according to a separate contract between Owner and Construction Manager.

1.03.1 THE WORK CONSISTS OF:

CONSTRUCTION OF A NEW FIRE STATION FOR THE COUNTY OF MADERA. WORK INCLUDES (BUT IS NOT LIMITED TO): ON SITE IMPROVEMENTS, NEW FIRE STATION BUILDING, MECHANICAL, PLUMBING, FIRE PROTECTION & ALARM, VEHICLE EXHAUST, EMERGENCY GENERATOR, COMMUNICATIONS, AND ELECTRICAL SYSTEMS, OFF SITE IMPROVEMENTS AS PART OF CONTRACT INCLUDES, BUT IS NOT LIMITED TO: NEW CURB CUTS, NEW SEWER LATERAL TO EDGE OF GUTTER, NEW GAS CONNECTIONS AND NEW ELECTRICAL CONDUIT STUBBED TO EDGE OF GUTTER.

1.04 CONTRACT

- A. The Work will be constructed under a single general construction contract.

1.05 CONTRACTOR'S USE OF PREMISES

- A. Contractor may be required to share use of Project site during construction period with contractors performing work under other contracts for construction of the overall Project and shall coordinate construction operations with those of other contractors., designated areas will be established for the shared use of the Contractor, and contractors performing work under other contracts. Contractor's use of premises is limited only by Owner's right to perform work or to obtain other contractors on portions of the Project.
- B. Confine operations to areas within Contract limits indicated. Portions of the site beyond areas in which construction operations are indicated are not to be disturbed.
- C. Keep driveways and entrances serving the premises clear and available to the Owner and the public at all times. The Contractor is to provide and maintain free and clear access to areas

throughout the site for emergency services. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site.

- D. Repair and replace damaged existing construction to remain such as curbs, parking lot paving, roadways, site vegetation and utilities.

1.06 WORK UNDER OTHER CONTRACTS

- A. Contractor shall cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work of those contracts or work under this Agreement.

1.07 OWNER-FURNISHED, CONTRACTOR-INSTALLED (OFICI) PRODUCTS

A. Owners Responsibilities:

1. Provide submittals, product data, and installation manuals to the Contractor.
2. Arrange and pay for delivery of products to the project site in accordance with the Progress Schedule.
3. Jointly inspect delivered items with the Contractor to verify condition and quantities.

B. Contractor's Responsibilities:

1. Coordinate delivery dates with the Owner to prevent project delays.
2. Receive, unload, and handle products at the site.
3. Inspect for completeness and evidence of shipping damage at the time of delivery. If damage is found, notify the Construction Manager and Owner immediately in writing.
4. Provide secure, climate-controlled storage and protection for products until time of installation.
5. Install, assemble, and connect products (including final utility connections) as indicated in the Contract Documents.
6. Once installed, protect the finished items from damage by construction traffic or other trades.

1.09 COORDINATION OF SYSTEM START-UP

- A. Coordinate with Division 01 Specifications

PART 2 – PRODUCTS (not used)

PART 3 – EXECUTION (not used)

END OF SECTION 01 11 00

SECTION 01 20 00

ALTERNATES, UNIT COSTS, AND BASIS OF AWARD

PART 1 - GENERAL

1.01 SECTION DESCRIPTION

- A. The administrative and procedural requirements outlined in this section govern the pricing and payment structures for the Riverstone Fire Station. which are essential components of the project scope required for separate agency funding. This section also defines the Basis of Award, which includes the Total Base Bid. Additionally, this section defines the Optional Alternate(s) which are discrete scopes of work that the County of Madera may, at its sole discretion, elect to add to the contract following the determination of the low bidder.

1.02 BASIS OF AWARD:

- A. Determination of Low Bidder: The "Basis of Award" used to determine the lowest responsive and responsible bidder shall be the sum of the following:
 - 1. Base Bid
- B. Owner's Rights: The County of Madera reserves the right to award the Contract based on the Total Base Bid alone.

1.03 UNIT COST:

- A. Definition: Specific portions of the Base Contract scope that must be bid as a separate lump-sum line item for accounting and funding purposes. These items are mandatory and are included in the Basis of Award.

1.04 OPTIONAL ALTERNATES:

- A. Definition: Work items that the County may elect to add to the contract at its sole discretion.
- B. Alternate #1: Added bus charging stations and associated work as shown on drawings.

1.05 SCHEDULE OF ALTERNATES

- A. Alternate No. 1: Added bus charging stations and associated work as shown on drawings.

PART 2 – PRODUCTS (not used)

PART 3 - EXECUTION (not used)

END OF SECTION 01 20 00

SECTION 01 25 00

SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General Conditions and Supplemental General Conditions and other Division 01 General Requirements, apply this Section.

1.02 SUMMARY:

- A. This Section specifies administrative and procedural requirements for handling requests for substitutions.
- B. The Contractor's Construction Schedule and the Schedule of Submittals are included under Section 01 33 00 "Submittal Procedures."
- C. Procedural requirements governing the Contractor's selection of products and product options are included under the General Conditions.

1.03 DEFINITIONS:

- A. Definitions used in this Article are not intended to change or modify the meaning of other terms used in the Contract Documents.
- B. Substitutions: Requests for changes in products, materials, equipment, and methods of construction required by Contract Documents are considered requests for "substitutions." The following are not considered substitutions:
 - 1. Revisions to Contract Documents requested by the Owner or Architect.
 - 2. Specified options of products and construction methods included in Contract Documents.
 - 3. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

1.04 SUBMITTALS:

- A. Substitution Request Submittal: Requests for substitution will be considered if received within 60 days of NTP. Requests received by the Construction Manager outside of this timeline will not be considered.
- B. Submit electronic copies of each request for substitution for consideration. Submit requests in the form and in accordance with procedures required for Change Order proposals Section 01 26 00 – "Contract Modification Procedures".
- C. Identify the product, or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:

1. Product Data, including Drawings and descriptions of products, fabrication, and installation procedures.
2. Samples where applicable or requested.
3. A detailed, side-by-side comparison of the significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include but is not necessarily limited to elements such as size, weight, durability, performance, and visual effect.
4. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate Contractors will become necessary to accommodate the proposed substitution.
5. A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
6. Cost information, including a proposal of the net change, if any, in the Contract Sum.
7. Certification by the Contractor that the substitution proposed is equal-to or better in every significant respect to that required by the Contract Documents, and that it will perform adequately in the application indicated. Include the Contractor's waiver of rights to additional payment or time, that may subsequently become necessary because of the failure of the substitution to perform adequately.
8. The contractor warrants that he/she has investigated the proposed product and determined that it is equal to or superior in all respects to that indicated or specified.
9. The Contractor waives claim for additional costs and time associated with the proposed product, which may subsequently become apparent.
10. The Contractor shall provide a signed statement that the proposed product is in full compliance with the Contract Documents, and applicable regulatory requirements, requires no changes to specified controls and monitoring systems that may be specified in other Sections, and Certify that the contractor will be responsible for coordination at no additional cost to the Owner
11. The Contractor shall provide information on availability of maintenance service, and source of replacement materials, and provide a sample of Manufacturer's standard form of guarantee or warranty for proposed product.

D. DELEGATED DESIGN AND ADMINISTRATIVE APPROVAL

Certain systems, including Fire Sprinkler and Fire Alarm, are designated as Delegated Design. Per the Madera County Building Official, these items shall not be submitted to the Building Department as deferred submittals. Instead, the Contractor shall submit fully engineered shop drawings and calculations to the Architect and Engineer of Record for review and final approval. The A/E review shall constitute the final authorization for fabrication and installation. The Contractor is responsible for ensuring that all such designs strictly adhere to the performance specifications and the code-compliant design intent established in the permitted Master Set. Copies of the A/E-approved submittals must be maintained on the job site at all times for reference by the Field Inspector.

1.05 CONSTRUCTION MANAGER'S ACTION :

- A. Within one (1) week of receipt of the request for substitution, the Construction Manager will request additional information or documentation necessary for evaluation of the request. Within ten (10) days of receipt of the request, or one (1) week of receipt of the additional information or documentation, whichever is later, the Construction Manager will notify the Contractor of acceptance or rejection of the proposed substitution. The Architect at his/her sole discretion will determine the acceptability of proposed products and his/her determination shall be final. If a decision on use of a proposed substitution cannot be made or obtained within the time allocated, use the product specified by name in the Contract Documents.
- B. No consideration will be given to a substitute product unless, in the Architect's judgment, it complies with the following conditions.
 - 1. Substitution Request is complete.
 - 2. It is equal in quality, performance, and serviceability.
 - 3. Its use does not entail changes in details or related construction.
 - 4. It is acceptable in regard to design and aesthetic effect.
 - 5. There is cost, time or both, advantage to the Owner.
- C. Acceptance of a product shall not relieve the contractor from responsibility for the proper execution of the Work and any other requirements of the Contract Documents.
- D. If a proposed product is not accepted, use the product originally specified or indicated in the Contract Documents.
- E. No products other than those indicated or specified in the Contract Documents shall be purchased or incorporated in the Work without the Architect's prior written acceptance.

PART 2 - PRODUCTS

2.01 SUBSTITUTIONS:

- A. Conditions: The Contractor's substitution request will be received and considered by the Architect when one or more of the following conditions are satisfied, as determined by the Architect; otherwise, requests will be returned without action except to record noncompliance with these requirements.
 - 1. Extensive revisions to Contract Documents are not required.
 - 2. Proposed changes are in keeping with the general intent of the Contract Documents.
 - 3. The request is timely, fully documented and properly submitted.
 - 4. The request is directly related to an "or equal" clause or similar language in the Contract Documents.
 - 5. The Specified product or method of construction cannot be provided within the Contract Time. The request will not be considered if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.

6. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
 7. A substantial advantage is offered the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities the Owner may be required to bear. Additional responsibilities for the Owner may include additional compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner or Separate Contractors, and similar considerations.
 8. The specified product or method of construction cannot be provided in a manner which is compatible with other materials, and where the Contractor certifies that the substitution will overcome the incompatibility.
 9. The specified product or method of construction cannot be coordinated with other materials, and where the Contractor certifies that the proposed substitution can be coordinated.
 10. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provides the required warranty.
- A. The Contractor's submittal and Architect's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with the Contract Documents, does not constitute an acceptable or valid request for substitution, nor does it constitute approval.

PART 3 - EXECUTION (not used)

END OF SECTION 01 25 00

SECTION 01 26 00
CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Sections:
 - 1. Requests for Interpretation (RFI) are specified in Section 01 26 15.

1.02 CHANGE ORDER PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Proposed changes in the work that will require adjustment to the Contract Sum or Contract Time will be issued by the Architect, with a detailed description of the proposed change and supplemental or revised Drawings and Specifications, if necessary.
 - 1. Proposal requests issued by the Architect are for information only. Do not consider them an instruction either to stop work in progress, or to execute the proposed change.
 - 2. Unless otherwise indicated in the proposal request, within **10- calendar days** of receipt of the proposal request, submit to the Architect for review an estimate of cost necessary to execute the proposed change.
 - a. Include a list of quantities of products to be purchased and unit costs, along with the total amount of purchases to be made. Furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include a statement indicating the effect the proposed change in the work will have on the Contract Time.
- B. Contractor-Initiated Change Order Proposal Requests: When latent or other unforeseen conditions require modifications to the Contract, the Contractor may propose changes by submitting a request for a change.
 - 1. Include a statement outlining the reasons for the change and the effect of the change on the work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and Contract Time.
 - 2. Include a list of quantities of products to be purchased and unit costs along with the total amount of purchases to be made. 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 if the proposed change in the work requires the substitution of one product or system for a product or system specified.
 - 5. Proposal Request Form: Use AIA Document G709 for Change Order Proposal Requests or a form furnished by the Owner's Representative.
- C. Supplemental Instructions from the Architect (ASI): Use AIA Form G710 or a form furnished by the Owner's Representative.

1.03 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: When the Owner and Contractor are not in total agreement on the terms of a Change Order Proposal Request, the Architect may issue a Construction Change

Directive on AIA Form G714 or other form furnished by the Owner's Representative, instructing the Contractor to proceed with a change in the work, for subsequent inclusion in a Change Order.

1. The Construction Change Directive will contain a complete description of the change in the work and designate the method to be followed to determine change in the Contract Sum or Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
- C. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

1.04 CHANGE ORDER PROCEDURES

- A. Upon the Owner's Representative's approval of a Change Order Proposal Request, the Contractor shall issue a Change Order for signatures of the Owner or Owner's Representative, Architect, and Contractor on AIA Form G701 or other form furnished by the Owner's Representative, as provided in the Conditions of the Contract.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION 01 26 00

SECTION 01 26 13

REQUEST FOR INFORMATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General Conditions and Supplemental General Conditions and other Division 01 General Requirements, apply to this Section.

1.02 SUMMARY:

- A. This Section specifies administrative and procedural requirements for Request for Information (RFI), including:
 - 1. Definitions
 - 2. The Request for Information Procedure
 - 3. Request for Information Review System

1.03 DEFINITIONS:

- A. General: To prevent misunderstanding between the Owner and the Contractor over project procedures, the following definitions are provided:
 - 1. Contract Document Clarification: An answer from the Construction Manager and/or Architect, in response to an inquiry from the Contractor, intended to make some requirement(s) of the Contract Documents clearly understood. Contract Documents clarifications may be sketches, drawings, or in narrative form and will NOT change any requirements of the drawings or plans. Responses to Contractor inquiries shall be outlined elsewhere in this Section.
 - 2. Project Communications: Routine written communications between the Owner and the Contractor shall be in letter, field memo or fax format. All such communications shall be processed through the Construction Manager and shall NOT be identified as Request for Information, nor shall they substitute for any other written provisions of these Contract Documents.
 - 3. Requests for Information: A written request from the Contractor to the Owner, seeking an interpretation or a clarification of some requirement of the contract documents. The Contractor shall clearly and concisely set forth the issue for which he/she seeks clarification or interpretation and why he/she believes a clarification is needed. Responses from the Owner will not change any requirements of the Contract Documents. Responses to Contractor inquiries shall be outlined elsewhere in this section.
 - 4. Submittals: Refer to Section 01 33 00 "Submittals".
 - 5. Construction Schedule Submittals: Refer to Section 01 32 00 "Construction Progress Documentation".

1.04 THE REQUEST FOR INFORMATION PROCEDURE

A. General: The following establishes the process and timing concerning RFI's and their responses:

1. In the event that the General Contractor or Subcontractor, at any tier, determines that some portion of the Contract Documents requires clarification or interpretation by the Architect, the General Contractor shall submit a Request for Information in writing to the Construction Manager. The written request shall be clearly titled "REQUEST FOR INFORMATION," in capital letters. Requests for Information may only be submitted by the General Contractor. The Contractor shall clearly and concisely set forth the issue for which clarification or interpretation is sought and why a response is needed from the Owner.
 2. The Construction Manager will review all Requests for Information to determine whether they are Requests for Information within the meaning of this term. If the Construction Manager determines that the document is not a Request for Information, it will be returned to the Contractor, unreviewed as to content, for resubmittal in the proper manner.
 3. Responses to Requests for Information shall be issued within fourteen (14) calendar days of receipt of the request from the Contractor unless the Construction Manager determines that a longer time is necessary to provide an adequate response. The Contractor shall not be entitled to any time extension due to the time it takes the Construction Manager to respond to the request provided that the Construction Manager responds within the fourteen (14) working days set forth above.
1. Responses from the Construction Manager will not change any requirement of the Contract Documents. In the event the Contractor believes that a response to a Request for Information will cause a change to the requirements of the Contract Documents, the Contractor shall immediately give written notice to the Construction Manager Owner stating that the Contractor considers the response to be a change in scope of work. Failure to give such written notice immediately shall waive the Contractor's right to seek additional time or cost under the Changes article found in the General Conditions.

1.05 THE REQUEST FOR INFORMATION REVIEW SYSTEM

- A. General: All documents labeled as RFI will be reviewed by the Construction Manager to determine whether or not the document meets the definition of an RFI, as stated previously. If the document submitted is an RFI, the document will be entered into the RFI Log and processed for a response.
- B. If the document submitted is not an RFI, it will be returned to the Contractor immediately with a standard letter of transmittal stating the following:

"This document is not an RFI and therefore is being returned to you without a response. This document has not been entered into the project's RFI Log. Resubmit document in the proper format as (circle one) Project Communications, Submittals, Substitution, Schedule Submittal or other, for processing."

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION (not used)

END OF SECTION 01 26 13

SECTION 01 29 00

PAYMENT PROCEDURES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Supplemental General Conditions and other Division 01 General Requirements, apply to this Section.

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements governing the Contractor's Applications for Payment.
 - 1. Coordinate the Schedule of Values and Applications for Payment with the Contractor's Construction Schedule, List of Subcontracts, and Submittal Schedule.
- B. The Contractor's Construction Schedule requirements are included in Section 01 32 00, "Construction Progress Documentation"; and Submittal Schedule requirements are included in Section 01 33 00, "Submittals".

1.03 SCHEDULE OF VALUES

- A. Coordinate preparation of the Schedule of Values with preparation of the Contractor's Construction Schedule. See Section 01 32 00 "Construction Progress Documentation" for additional information.
 - 1. Within thirty (30) calendar days after the Award of Contract, the Contractor shall submit Schedule of Values for review by Construction Manager, allocating a dollar value for each activity on the Construction Schedule.
- B. Format and Content: Use the Construction Schedule as a guide to establish the format for the Schedule of Values.
 - 1. Identification: Include the following identification on the Schedule of Values:
 - a. Project name and location.
 - b. Name of the Owner.
 - c. Project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 - 2. Arrange the Schedule of Values in a tabular form with separate columns to indicate the following for each item listed:
 - a. Generic name.
 - b. Related Specification Section.

- c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that have affected value.
 - g. Dollar value.
 - h. Percentage of Contract Sum to the nearest one-hundredth percent, adjusted to total one hundred (100) percent.
3. The Schedule of Values shall be a product of the CPM Schedule and provide sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. The following information shall be minimally illustrated in the Schedule of Values and be subject to approval by the Construction Manager.
- a. Dollar value for each activity will be cost including labor and materials. The dollar value of the General Conditions as well as Overhead and Profit shall be dispersed equally throughout the CPM Schedule activities.
 - b. Make sum of activity costs equal the Contract Amount.
 - c. Separate line items for General Conditions and may be required *by the Owner*.
4. Component amounts shall be rounded off to the nearest whole dollar, and the cumulative total thereof shall equal the Contract Amount.
5. All material storage will be the responsibility of the contractor.
6. The CPM Schedule shall be progressed in accordance with the General Requirements Section "Construction Progress Documentation" 01 32 00 and the schedule update shall be utilized as the basis for the Contractor's Application for Payment.

1.04 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as reviewed by the Owner, Construction Manager and Architect, and paid for by the Owner. See General Conditions for additional information regarding progress payments and final payment.
 - 1. The initial Application for Payment, the Application for Payment at time of Completion, and the final Application for Payment involve additional requirements as listed below.
 - 2. Contractor to submit cash flow analysis quarterly as required for reporting to Board of Corrections.
- B. Payment Application Times: Each progress payment date is as indicated in the Agreement. The period of construction Work covered by each Application or Payment is the period indicated in the Agreement.
- C. Payment Application Forms: Use AIA Document G702 and Continuation Sheets G 703 as the form for Application for Payment.

- D. Application Preparation: Complete every entry on the form, including notarization and execution by person authorized to sign legal documents on behalf of the Contractor. Incomplete applications will be returned without action.
1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions have been made.
 2. Include amounts of Change Orders issued prior to the last day of the construction period covered by the Application.
- E. Transmittal: Submit three (3) executed copies of each Application for Payment to the Construction Manager by means ensuring receipt within twenty-four (24) hours; one (1) copy shall be complete, including waivers of lien and similar attachments, when required.
1. Transmit each copy with a transmittal form listing attachments, and recording appropriate information related to the application in a manner acceptable to the Construction Manager.
- F. Waivers of Mechanics Lien and Stop Notice: With each Application for Payment, submit waivers of mechanics lien and stop notices from every entity who may lawfully be entitled to file a mechanics lien or stop notice arising out of the Contract, and related to the Work covered by the payment.
1. Submit partial waivers on each item for the amount requested on each item.
 2. When an application shows completion of an item, submit final or full waivers.
 3. The Owner reserves the right to designate which entities involved in the Work must submit waivers.
- G. Initial Application for Payment: Administrative actions and submittals that must precede the submittal of the first Application for Payment include the following:
1. List of subcontractors, including names, addresses, and contact persons.
 2. List of principal suppliers and fabricators.
 3. Schedule of Values.
 4. Contractor's Construction Schedule (preliminary if not final).
 5. Submittal Schedule (preliminary if not final).
 6. List of Contractor's staff assignments.
 7. List of Contractor's principal consultants.
 8. Copies of authorizations and licenses from governing authorities for performance of the Work.
 9. Initial survey and damage report.
- H. Final Payment Application: Administrative actions and submittals which must precede submittal of the final payment Application for Payment include the following:

1. All pertinent permits and similar approvals such as Mader County Building Department, , Department of Health and Environmental Services, SJVAPCD, and others sign-off.
2. Warranties (guarantees) and maintenance agreements.
3. Test/adjust/balance records.
4. Maintenance instructions.
5. Start-up performance reports.
6. Change-over information related to Owner's occupancy, use, operation, and maintenance.
7. Final cleaning.
8. Extra materials.
9. Application for reduction of retainage, and consent of surety.
10. Completion of Project closeout requirements.
11. Completion of items specified in order to achieve Completion.
12. Assurance that unsettled claims will be settled.
13. Transmittal of required Project construction records to Owner.
14. Proof that taxes, fees and similar obligations have been paid.
15. Removal of temporary facilities and services.
16. Removal of surplus materials, rubbish and similar elements.
17. Ensure Owner's exclusive access.
18. Sign off sheets for wastewater treatment tracking conducted by contractor.
19. Post Warranty Bond in the amount of ten (10%) percent of Final Contract Amount.

PART 2 – PRODUCTS (not used)

PART 3 – EXECUTION (not used)

END OF SECTION 01 29 00

SECTION 01 31 13

PROJECT COORDINATION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Supplemental General Conditions and other Division 01 General Requirements, apply to this Section.

1.02 SUMMARY:

- A. This Section specifies administrative and supervisory requirements necessary for Project coordination including, but not necessarily limited to:
 - 1. General project coordination procedures.
 - 2. Conservation.
 - 3. Coordination Drawings.
 - 4. Administrative and supervisory personnel.
 - 5. Project meetings.
 - 6. General installation provisions.
 - 7. Cleaning and protection.

1.03 Progress meetings, coordination meetings and pre-installation conferences are included in Section 01 31 19 – Project Meetings.

1.04 Requirements for the Contractor's construction schedule are included in Section 01 32 00- Construction Progress Documentation.

1.05 COORDINATION:

- A. Coordination: Coordinate construction activities included under various sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different sections of the Specifications that are dependent upon each other for proper installation, connection, and operation.
- B. Each contractor shall coordinate his/her construction operations with those of other contractors and entities, including those performing work under other contracts, to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate his/her operations with operations included in different sections that depend on each other for proper installation, connection, and operation. Special attention is given to Section 01 11 00 – Summary of Work, regarding Contractor's use of premises and work to be performed under separate contracts.
- C. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.

- D. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
- E. Make adequate provisions to accommodate items scheduled for later installation.
- F. Where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.
- G. Requirements for coordination drawings are included in Section 01 04 20 – Coordination Drawings.

1.06 ADMINISTRATIVE PROCEDURES

A. Coordinate scheduling and timing of required administrative procedures with other construction activities, including those of other contracts, to avoid conflicts and ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

- 1. Preparation of Contractor's Construction Schedule.
 - 2. Preparation of the Schedule of Values.
 - 3. Installation and removal of temporary facilities and controls.
 - 4. Delivery and processing of submittals.
 - 5. Progress meetings.
 - 6. Pre-installation conferences.
 - 7. Project closeout activities.
- B. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water and materials.
- C. Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work. Refer to other sections for disposition of salvaged materials that are designated as Owner's property.

1.07 SUBMITTALS:

- A. Staff Names: Within fifteen (15) days of Notice to Proceed, submit a list of the Contractor's principal staff assignments, including the Superintendent and other personnel in attendance at the Project site; identify individuals, their duties, and responsibilities; list their addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
1. Post copies of the list in the Project meeting room, the temporary field office, and each temporary telephone.

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION PROVISIONS:

- A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. Manufacturer's Instructions: Comply with the manufacturer's installation instructions and recommendations, to the extent that these instructions and recommendations are more explicit or more stringent than requirements contained in Contract Documents.
- C. Verify characteristics of interrelated assemblies and equipment for compatibility. Coordinate Work having independent responsibilities for installation connection, or servicing access.
- D. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.
- E. Provide attachment and connection devices and methods necessary for securing work. Secure work true to line and level. Allow for expansion and building movement.
- F. Visual Effects: Provide uniform joint width in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Construction Manager for final decision.
- G. Recheck measurements and dimensions, before starting each installation.
- H. Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.
- I. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.
- J. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Construction Manager for final decision.

3.02 CLEANING AND PROTECTION:

- A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration prior to Final Acceptance.
- B. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- C. Limiting Exposures: Supervise construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging or otherwise deleterious exposure during the construction period.
- D. Execute periodic cleaning to keep Work, Site, and adjacent properties free from accumulations of waste materials, rubbish, and windblown debris, resulting from construction operations. Leave the work "broom clean".
- E. Provide onsite containers for collection of waste materials, debris, and rubbish.

- F. Remove waste materials, debris, and rubbish from site periodically and as often as necessary to maintain an orderly construction site and dispose of at legal disposal areas away from site.
- G. Do not allow trash containers to overflow.
- H. Clean interior spaces prior to start of finish painting and continue cleaning on as-needed basis until painting is finished.
- I. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly coated surfaces.

END OF SECTION 01 13 31

SECTION 01 31 19

PROJECT MEETINGS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Supplemental General Conditions and other Division 01 General Requirements, apply to this Section.

1.02 PRECONSTRUCTION CONFERENCES

- A. Prior to commencement of work, a pre-construction conference will be held to discuss procedures to be followed during the progress of the Work. The meeting will be scheduled after execution of the agreement and prior to commencement of work.
- B. Location: To be determined by Construction Manager.
- C. Attending shall be:
 - 1. Construction Manager
 - 2. Architect and his/her professional consultants, as needed
 - 3. Contractor
 - 4. Contractor's Superintendent
 - 5. Major subcontractors
 - 6. Owner Representatives
 - 7. Others as appropriate
- D. Agenda: Following is suggested agenda. Actual agenda will be prepared and distributed by Construction Manager prior to meeting:
 - 1. Introductions
 - 2. Distribution and discussion of:
 - a. List of major subcontractors and suppliers
 - b. Projected Construction Schedules
 - 3. Critical work sequencing and reiteration of contract obligation toward meeting milestones.
 - 4. Major equipment deliveries and priorities.
 - 5. Project Coordination.
 - 6. Designation of responsible personnel.

7. Procedures and processing of:
 - a. Correspondence
 - b. Submittals
 - c. Field Orders and clarifications
 - d. Proposal requests and quotations
 - e. Change Orders and Work Authorizations
 - f. Applications for Payment
 - g. Requests for Information
8. Procedures for maintaining Record Documents
9. Use of premises:
 - a. Office, work and storage areas
 - b. Owner requirements
10. Construction facilities
11. Temporary utilities
12. Security considerations
13. Housekeeping and clean-up procedures
14. Insurance requirements
15. Wage and hour compliance
16. Noise and dust control
17. Testing and Inspection
18. Survey control
19. Other Subjects as appropriate

1.03 PROGRESS MEETINGS

- A. The Construction Manager will schedule and hold meetings weekly. The General Contractor will prepare Agenda for such meetings and distribute to the interested parties at the next successive meeting.
- B. Location: Contractor's field office or other acceptable location. Time and location of the meeting will be determined during the Pre-construction Conference.

- C. Attending shall be:
1. Construction Manager
 2. Contractor
 3. Contractor's Superintendent
 4. Subcontractors, as appropriate to the Agenda
 5. Suppliers, as appropriate to the Agenda
 6. Owner, as needed
 7. User Department representatives as needed
 8. Architect, and his/her professional consultants as needed
 9. Others, as appropriate to the Agenda
- D. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of the Project.
1. Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule.
 - a. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 2. Review the present and future needs of each entity present, including such items as:
 - a. Interface requirements
 - b. Time
 - c. Sequences
 - d. Deliveries
 - e. Off-site fabrication problems
 - f. Access
 - g. Site utilization
 - h. Temporary facilities and services
 - i. Hours of work
 - j. Hazards and risks (Contractor's Responsibility)

- k. Housekeeping
 - l. Quality and work standards
 - m. Change Orders
 - n. Documentation of information for payment requests
 - o. RFI's
 - p. Submittals
 - q. Correction Notices
 - r. Disputed items
3. Reporting: No later than each successive meeting, Construction Manager will distribute copies of minutes of the meeting to each party present. Included will be a brief summary, in narrative form, of progress since the previous meeting and report.
 4. Schedule Updating: Contractor to revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.

1.04 QUALITY ASSURANCE / QUALITY CONTROL MEETINGS

- A. The Construction Manager will schedule and hold meetings weekly. Construction Manager will prepare Agenda for such meetings and distribute to the interested parties at the next successive meeting.
- B. Location: Contractor's field office or other acceptable location. Time and location of the meeting will be determined during the Pre-construction Conference.
- C. Attending shall be:
 1. Construction Manager
 2. Contractor
 3. Contractor's Superintendent
 4. Subcontractors, as appropriate to the Agenda
 5. Owner, as needed
 6. Architect, and his/her professional consultants as needed
 7. Inspector of Record
 8. Others, as appropriate to the Agenda
- D. Agenda: Review deficiencies in construction work and set deadlines to complete the deficient work. Deficiencies to be reviewed will have been noted by the Inspector of Record, Testing Laboratory,

Construction Manager, Contractor and its subcontractors. Progress will be tracked by the Construction Manager and reviewed weekly by all parties.

1. Reporting: No later than each successive meeting, Construction Manager will distribute copies of minutes of the meeting to each party present. Included will be a brief summary, in narrative form, of progress of each deficient item since the previous meeting and report.
2. Deficiency Corrections: In addition to the other requirements of the contractor's contract with the County of Madera for this Project, contractor will make every effort to have each deficiency expedited in a manner that will not delay the Work. If the contractor fails to complete the deficiencies in a timely manner that results in delays to the Project Schedule, contractor shall fully bear the time and cost impacts of such actions.

1.05 PROGRESS PAYMENT MEETINGS

- A. Schedule and hold a billing meeting each month prior to submittal of Application for Payment. Billing meetings shall coincide with last of month progress meeting, whenever possible.
- B. Location: Contractor's field office or other acceptable location.
- C. Attending shall be:
 1. Construction Manager
 2. Architect, as needed
 3. Contractor
 4. Owner, as needed
- D. Prepare an itemized draft of the month's proposed billing for review with the Construction Manager, Architect and Owner at the billing meeting. Refer to Section 01 29 00 – Payment Procedures, for further requirements.
- E. Following review of the proposed billing, revise as required, prepare Application for Payment, and submit to the Construction Manager. The Construction Manager will certify and forward it to the Owner, who will authorize payment upon receipt of partial waivers of lien from the Contractor and all Subcontractors for previous payment.

1.06 PRE-INSTALLATION CONFERENCES

- A. Contractor shall convene a pre-installation conference for items of work contained in each division of the specifications, each trade within the division, and each subcontractor within the division.
 1. Contractor shall convene a pre-installation conference prior to commencing the Work of the section, trade, or subcontractor.
 2. Contractor shall require attendance of each subcontractor and each trade directly affecting or affected by the Work within the division.
 3. Construction Manager, Architect and Owner may attend pre-installation conferences.

4. Contractor shall convene additional conferences when required by individual section of the specification.
5. Contractor shall prepare an agenda, preside over the conference, and record minutes, and distribute copies within two (2) days after the conference to participants, with three (3) copies to the Construction Manager.
6. At a minimum, Contractor shall review conditions of installation, coordination, preparation, approved submittals, contract documents, schedule, testing and inspection, and means and methods planned to be used to perform the work.
7. Within ten (10) days after Notice to Proceed, submit a proposed list of pre-installation conferences, the approximate dates of the conferences, and items of work to be covered, for approval by the Construction Manager. Provide the Construction Manager with the actual date, time, and location of each conference at least one (1) week in advance of each conference.

1.07 GUARANTEE/WARRANTIES, BONDS, AND SERVICE AND MAINTENANCE CONTRACTS REVIEW MEETING

- A. Eleven (11) months following date of Notice of Completion, hold a meeting for the purpose of review of guarantees/warranties, bonds, and service and maintenance contracts for materials and equipment. Take action as appropriate to implement repair or replacement of defective items, and to extend service and maintenance contracts.
- B. Attending shall be:
 1. Construction Manager
 2. Architect
 3. Owner's and Architect's Consultants, as appropriate
 4. Contractor
 5. Subcontractors, as appropriate to the Agenda
 6. Suppliers, as appropriate to the Agenda
 7. Others, as appropriate to the Agenda
 8. Owner

PART 2 – PRODUCTS (not used)

PART 3 – EXECUTION (not used)

END OF SECTION 01 31 19

SECTION 01 32 00
CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Supplemental General Conditions and other Division 01 General Requirements, apply to this Section.

1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's Construction Schedule
 - 2. Short Interval Schedule
 - 3. Contractor Reports
- B. Related Sections include the following:
 - 1. General Requirements Section xxx - "Project Coordination" for submitting and distributing meeting and conference minutes.
 - 2. General Requirements Section xxx - "Submittals " for submitting schedules and reports.
 - 3. General Requirements Section xxx - "Quality Requirements" for submitting a schedule of tests and inspections.
 - 4. General Requirements Section xxx - "Project Closeout" for submitting Project Record Documents at Project closeout.
- C. Requirements for Critical Path Method "CPM" scheduling are included to insure adequate planning and execution of the Work and to assist the Owner in evaluating progress of the Work economically and chronologically.
- D. The Contractor shall be solely responsible for establishing the schedule for the Work and shall be responsible for such schedule to be consistent with meeting the contract milestone and completion dates as established by the Owner.
 - 1. The Contractor shall develop a CPM Schedule demonstrating fulfillment of all contract requirements. The project schedule shall be kept current to be utilized for scheduling, coordinating, monitoring work progress, and for preparation of the monthly application for payment under this Contract including all work of Subcontractors and equipment and material suppliers.
 - 2. Schedule shall include activities pertaining to submission of product data and sample submittals and shop drawings, fabrication and delivery times, and these schedule activities shall be linked to the start of the correspondent work activity.
- E. Contractor shall designate a Scheduling Representative who is trained and experienced in compiling construction scheduling data, in analyzing scheduling data by use of CPM, and in preparation and issuance of periodic reports as required herein. The Contractor's Scheduling Representative shall have direct control and complete authority to act on behalf of the Contractor regarding the fulfillment of all project schedule requirements.

1.03 QUALITY ASSURANCE

- A. The following publication is cited as reference for CPM and scheduling techniques utilized in this Contract:

1. J.J. Moder & C.R. Phillips, Project Management with CPM & Pert. New York: Reinhold Publishing Corp.
- B. All schedule and report work shall use a computer-based CPM, compatible with Primavera Suretrak Construction manager (for Microsoft Windows).
- C. All schedule submittals shall include a minimum of one (1) reproducible, three (3) prints, with an electronic copy of the current schedule.

1.04 INTERIM SCHEDULE

- A. Within twenty-one (21) calendar days after Notice to Proceed and prior to submission of the first payment request, the Contractor shall submit to the Construction Manager a practical ninety (90) calendar day Interim Schedule. The Interim Schedule shall reflect the following information:
 1. Procurement, submittals, construction drawings, shop drawings, approvals, fabrication and delivery of all major and long lead equipment and material items.
 2. Work expected to occur within the first ninety (90) calendar days of the project, consistent with meeting all established milestone and completion dates.
 3. The Interim Schedule shall be descriptive of the Work to be performed so that the Contractor and the Construction Manager can easily monitor progress of the Work. All work activities shall be manpower and cost loaded and will be the basis for payment during the beginning months of the project.
 4. Within fifteen (15) calendar days after receipt of the Interim Schedule, the Construction Manager will notify the Contractor of the approval or disapproval of the Interim Schedule. In the event of disapproval, the Contractor shall resubmit the schedule within seven (7) calendar days. No progress payments will be made for work in progress or completed or submittals reviewed until the Interim Schedule is approved.

1.05 OFFICIAL CONTRACT SCHEDULE

- A. The CPM Schedule to be prepared by the Contractor pursuant to this Section will be a part of a total system for scheduling, reporting work progress, and preparing the monthly payment application.
- B. Within sixty (30) calendar days after the Notice to Proceed, the Contractor shall submit to the Construction Manager four (4) original full-size prints, and one (1) electronic copy of the complete Contract Schedule for approval or disapproval. In the event the complete Contract Schedule is disapproved, the Contractor shall resubmit a corrected schedule within fifteen (15) calendar days after the notice of disapproval is received by the Contractor.
- C. Should the Contract Schedule not be accepted within ninety (90) calendar days after Notice to Proceed, the Contractor may be due provisional progress payments(s) on work performed, based on the Interim Schedule. It is the responsibility of the Contractor to reconcile such cost information and payments with the Contract Schedule. However, no payment shall be approved, or submittals reviewed after the ninety (90) calendar day period, until the Contract Schedule has been accepted by the Owner.
- D. The approved Interim Schedule shall be incorporated into the final Contract Schedule and shall represent the initial ninety (90) calendar days of the Contract Schedule.
- E. The initial submittal of the Contract Schedule shall not reflect contract changes or delays. These changes shall be added within the first (1st) schedule revision.
- F. The initial submittal of the Official Contract Schedule shall include, in addition to construction activities, the following:
 1. The submittal and review of construction drawings, shop drawings and materials, the procurement and fabrication of major materials and equipment, and their installation and testing.

2. Contract requirements dates of all or parts of the Work will be shown including all activities of the Owner that affect the progress of the Work.
 3. Activities of completed work ready for use by next trade, etc.
 4. Activities relating to different areas of responsibility, such as sub-contracted work, which is distinctly separate from that being done by Contractor directly.
 5. Different categories of work as distinguished by craft or crew requirements.
 6. Different categories of work as distinguished by materials.
 7. Distinct and identifiable subdivisions of work such as structural slabs, beams, or columns.
 8. Location of work within the project that necessitates different times or crew to perform.
 9. Outage schedules of limiting times that existing utility services may be interrupted to construct the Project.
 10. Include punch list and Mechanical, Piping, and Electrical (MPE) system(s) flush, testing, balance, and maintenance personnel training.
 12. Acquisition and installation of equipment and materials supplied and/or installed by Owner or separate contractors.
 13. No activity shown on the CPM schedule shall have a duration in excess of twenty (20) calendar days, except passive activities such as curing. The Contractor will be responsible for dividing the Work under the Contract to accommodate this requirement.
- G. Major Equipment/Materials: For all major equipment and materials fabricated or supplied for Project, Construction Schedule shall show a sequence of activities including:
1. Preparation of shop drawings and sample submissions.
 2. Review of shop drawings and samples.
 3. Shop fabrication, delivery, and storage.
 4. Erection or installation.
 5. Test of equipment and materials.
 6. Required dates of completion.
- H. Completion: Construction Schedule shall show a completion date for the Work that is no later than the required date for completion.
- I. Construction activities shall be delineated separately for off-site work, site development, earthwork, utilities, roads, parking lots, fences, and each structure, and shall incorporate all milestones.
- J. The network diagrams shall clearly indicate any work that is planned to be accomplished on a work schedule other than eight (8) hours per day and forty (40) hours per week.
- K. The basic concept of CPM network diagramming will be followed to show how the start of a given activity is dependent on the completion of preceding activities and its completion restricts the start of following activities. The diagrams shall show a continuous flow from left to right with no right to left sequences.
- L. The following information will be provided in a report for each network activity:
1. Activity description.
 2. Activity duration in workdays.
 3. Activity cost. The Contract Amount shall be broken down with the appropriate values distributed to the network diagram activities.

4. Working activities and General Conditions activities shall be identified separately.
 5. Estimated manhours for each activity.
 6. Activity predecessors.
 7. Activity successors.
 8. Activity logic ties.
- M. The Contractor shall provide to the Construction Manager their schedule data together with associated costs. Schedule information provided by the Contractor shall support milestone and completion dates specified in the contract documents, and the sum of the network activity costs shall equal the total contract price.
- N. Schedule review by the Owner and its agents is limited to ensuring the logic of sequencing is reasonable and Contractor has demonstrated ability to meet contractual milestone and completion dates. Review of schedule should not be construed as direction from the Owner or its agents to Contractor on how to schedule the work.
- O. Subsequent to approval of the contract schedule, the Contractor will provide one (1) reproducible sepia copy of the network diagrams and one (1) electronic copy, plus copies of all supporting documents (Contract Price, Schedule of Values, breakdown, etc.) Monthly update data will be submitted in the same form and numbers. Size of network diagrams for each sheet shall be no larger than thirty inches by forty-two inches (30" x 42") or as approved by the Construction Manager.
- P. After Completion and Acceptance of the Official Contract Schedule: The Contractor will provide computer reports thereafter, as follows:
1. CPM Schedule Reports: The Contractor shall submit copies of Activity, Logic, Total Float, and Earnings CPM reports concurrent with the CPM Schedule updates.

Activity Report: List of all activities sorted by activity number and then early start or actual start date.

Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start or actual start date.

Total Float Report: List of all activities sorted in ascending order of total float.

Earnings Report: Compilation of Contractor's total earnings from the Notice to Proceed until the most recent Application for Payment.

The format for each report shall contain the following information for each activity:

 - a. Activity Number
 - b. Activity Description
 - c. Original Duration in days
 - d. Estimated remaining duration in days
 - d. Early and late finish dates
 - e. Percentage of each activity completed as of each report
 - f. Remaining float/days behind schedule
 - g. Responsibility for activity
 - h. Current status of activity as compared to baseline schedule
 2. Earnings / Cost Reports: Initial and subsequent Cost Reports will include the following formation for each activity, sorted by trade activity:
 - a. Activity Number

- b. Activity Description
- c. Percentage of value of Work in place against total value
- d. Total cost of each activity
- e. Value of Work in place since last report
- f. Value of Work in place to date
- g. Value of incomplete Work

1.06 SHORT INTERVAL SCHEDULES

- A. Three (3) Week Window: At each weekly progress meeting, the Contractor shall produce a detailed three (3) week window of the current schedule, indicating activities scheduled for the current and following weeks.

1.07 PAYMENT PROGRESS REPORTING

- A. Construction Manager and Contractor shall select a specified time for updating the Project Schedule at the jobsite each month.
 - 1. The Construction Manager and Contractor and their designated scheduling representatives will attend the meeting to review the project progress.
 - 2. The Contract Schedule shall be the basis for monthly pay requests derived from the joint review of the cost loaded schedule.
 - 3. All progress and status information provided by the Contractor shall clearly define the reporting period for which the status is provided.
- B. At the monthly progress review meeting, the Contractor will provide "actual start" and "actual completion" dates for activities that were started or completed during the reporting period. The Contractor and the Construction Manager will agree upon and assign percent complete values to activities in progress. In the event of a disagreement, the Owner, or its designated representative, shall make the final decision as to percent completion of each activity.
- C. After joint review, Construction Manager will process the Contractor's pay request based on progress from the Schedule.
 - 1. Payment to the Contractor shall be made from the progress reflected by the Interim or the Contract Schedule.

1.08 CONTRACT SCHEDULE PROVISIONS

- A. Time is of the Essence: Whenever it becomes apparent from the current monthly progress review that phases of Work or the Contract Completion Date will not be met, through no fault of the Owner, the Contractor will take the following actions with no change in the contract amount:
 - 1. Increase construction manpower to eliminate an adverse backlog of work.
 - 2. Increase the number of working hours per shift, shifts per day, working days per week, the amount of construction equipment, or any combination of the foregoing to eliminate the adverse backlog of work.
- B. The Contract Schedule, as updated and subject to review by the Owner, constitutes an integral part of the Contractor's performance under the Agreement.
- C. Should any activity fall fourteen (14) calendar days or more behind the Official Contract Schedule reviewed by the Owner, the Owner will have the right to order the Contractor to expedite completion of that activity using whatever means are appropriate and necessary, without additional compensation to the Contractor.
- D. Should any activity fall twenty (20) or more calendar days behind the Official Contract Schedule

reviewed by the Owner, through no fault of the Owner, the Owner will have the right to perform the activity or have the activity performed by whatever method the Owner deems appropriate. All costs incurred by the Owner in connection with expediting such activity under this subparagraph shall be reimbursed promptly to the Owner by the Contractor (see also General Conditions 'Owner').

- E. It is expressly understood and agreed that the failure by the Owner to either order the Contractor to expedite an activity or to expedite the activity by other means, pursuant to the two (2) preceding paragraphs, shall not be considered precedent setting with respect to any other activities which may fall behind the Official Contract Schedule approved by the Owner; nor will it relieve the Contractor from completion of the Project Work in accordance with the Official Contract Schedule and the Contract Completion Date.
- F. Owner's acceptance of, or its review of, comments about any schedule or scheduling data shall not relieve the Contractor from its sole responsibility to plan for, perform, and complete the Work within the Contract Time. Acceptance of or review of comments about any schedule shall not transfer responsibility for any schedule to Owner nor imply its agreement with; (1) any assumption upon which such schedule is based; or (2) any matter underlying or contained in such schedule.
- G. Failure of Owner to discover errors or omissions in schedules that it has reviewed, or to inform Contractor that Contractor, Subcontractors, or others are behind schedule, or to direct or enforce procedures for complying with the Contract Schedule, shall not relieve Contractor from its sole responsibility to perform and complete the Work within the Contract Time and shall not be a cause for an adjustment of the Contract Time or the Contract Sum.
- H. Schedule Revisions:
 - 1. General: Revisions to reviewed Construction Schedules must be approved in writing by the Owner and Construction Manager.
 - 2. Contractor: Submit requests for revision to schedule to the Owner together with written rationale for revisions and description of logic for rescheduling Work and maintaining Specific Contractual Milestone Dates listed in Contract Documents.
 - 3. Proposed revisions acceptable to Owner will be incorporated into next update of Construction Schedule.
- I. Acceptance: Acceptance of revised schedule by Owner does not relieve Contractor of meeting contractual milestone and completion dates.

1.09 RECOVERY SCHEDULE

- A. General: Should a progressed Construction Schedule show the Contractor to be fourteen (14) or more calendar days behind schedule at any time during construction, Contractor will prepare Recovery Schedule displayed on CPM schedule, at no additional costs to Owner. Prepare Recovery Schedule to show plan for returning to original schedule as expeditiously as possible.
- B. Schedule Preparation: Within three (3) days after notice from Owner, prepare and submit to Owner a Recovery Schedule, incorporating best available information from Subcontractors and others which will permit return to Construction Schedule at earliest possible time. Prepare Recovery Schedule to same level of detail as Construction Schedule and for maximum duration of one (1) month.
- C. Schedule Review: Within five (5) days after notice from Owner, participate in conference with Owner to review and evaluate Recovery Schedule. Submit revisions necessitated by review for Owner's approval within two (2) days of conference. Use approved Recovery Schedule for its planned duration as basis for return to Construction Schedule.
- D. Schedule Assessment: Five (5) days prior to expiration of Recovery Schedule, confer with Owner to assess effectiveness of Recovery Schedule. As a result of this conference, Owner will direct Contractor as follows:
 - 1. Behind Schedule: If Owner determines Contractor is still behind schedule, Owner will direct

Contractor to prepare another Recovery Schedule for subsequent pay period.

2. On Schedule: If Owner determines Contractor has successfully complied with provisions of Recovery Schedule, Owner will direct Contractor to return to use of Construction Schedule.

1.10 FLOAT TIME

- A. Float or slack time associated with one (1) chain of activities is defined as amount of time between earliest start date and latest start date or between earliest finish date and latest finish date for such activities, as depicted on Construction Schedule. Float or slack time is not for exclusive use or benefit of either Owner or Contractor. However, if float time associated with any chain of activities is expended but not exceeded by any actions attributable to Owner, Contractor will not be entitled to any extension in the Contract time.

1.11 SUBMITTALS

- A. Contractor's Construction Schedule: Submit one (1) electronic copy, three (3) printed copies, and one (1) reproducible of initial schedule large enough to show entire schedule for entire construction period.
- B. Construction Photographs: Submit prints in compliance with General Requirements Section - Photographic Documentation.
- C. Special Reports: Submit three (3) copies at time of unusual event.

1.12 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, submittals schedule, progress reports, payment requests, and other required schedules and reports.

PART 2 - PRODUCTS

2.01 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Procedures: Comply with procedures contained in Associated General Contractors (AGC) "Construction Planning & Scheduling."
- B. Time Frame: Extend schedule from date established for Notice to Proceed to date of Notice of Completion.
 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- C. Activities: Treat each tier or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
 1. Activity Duration: Define activities so no activity is longer than twenty (20) days, unless specifically allowed by Construction Manager.
 2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than forty-five (45) days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 3. Submittal Review Time: Include review and re-submittal times indicated in General Requirements Section - Submittal Procedures in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule and show how the sequence of the Work is affected.

1. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction
 - b. Limitations of continued occupancies
 - c. Uninterruptible services
 - d. Use of premises restrictions
 - e. Environmental control
2. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Subcontract awards
 - b. Submittals
 - c. Purchases
 - d. Installation
 - e. Tests and inspections
 - f. Adjusting
 - g. Curing
3. Area Separations: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
 - a. New construction
 - b. Completion
- E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed and Notice of Completion.
- F. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis (schedule fragnet) to demonstrate the effect of the proposed change on the overall project schedule.

2.02 INTERIM CONSTRUCTION SCHEDULE

- A. Bar-Chart Schedule: Submit preliminary horizontal bar-chart-type construction schedule within twenty-one (21) days of date established for the Notice to Proceed.
- B. Preparation: Indicate each significant construction activity separately. Identify first (1st) workday of each week with a continuous vertical line. Outline significant construction activities for first (1st) ninety (90) days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities

2.03 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
 1. List of subcontractors and count of personnel at Project site
 2. List the CPM Schedule work activity number being performed for each subcontractor listed in Item 1 above as well as the work status, (e.g., S=Start, C=Continuing, F=Finished). At least weekly also include the approximate percent complete of those activities listed.
 3. Accidents
 4. Meetings and significant decisions

5. Unusual events (refer to special reports)
 6. Stoppages, delays, shortages, and losses
 7. Emergency procedures
 8. Orders and requests of authorities having jurisdiction
 9. Change Orders received and implemented
 10. Construction Change Directives received
 11. Services connected and disconnected
 12. Notice of Completions authorized
- B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare a detailed report. Submit with a request for information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.04 SPECIAL REPORTS

- A. General: Submit special reports directly to Construction Manager within one (1) day of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Construction Manager in advance when these events are known or predictable.

PART 3 - EXECUTION

3.01 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue updated schedule one (1) week before the last regularly scheduled progress meeting.
1. Include required CPM reports with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 2. As the Work progresses, indicate Actual Completion percentage for each activity.
- B. Distribution: Distribute one (1) copy on CD, and three (3) hard copies of updated schedule to the Construction Manager, and distribute to separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies of updated schedule in Project meeting rooms and temporary field offices.
 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

[END OF SECTION 01 32 00]

SECTION 01 33 00

SUBMITTALS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General Conditions and Supplemental General Conditions and other Division 01 General Requirements, apply to this Section.

1.02 SUMMARY:

- A. This Section specifies administrative and procedural requirements for submittals required for performance of the Work, including:
 - 1. Bid breakdown of apparent low bidder (Instructions to Bidders)
 - 2. Contractor's Construction Schedule.
 - 3. Submittal Schedule.
 - 4. Shop Drawings.
 - 5. Fire Department Approvals
 - 6. All permits
 - 7. Product Data.
 - 8. Samples.
- B. Administrative Submittals: Refer to other Division -1 Sections and other Contract Documents sections for requirements for administrative submittals. Such submittals include, but are not limited to:
 - 1. Applications for payment.
 - 2. Performance and payment bonds.
 - 3. Insurance certificates.
 - 4. List of subcontractors.
 - 5. Construction Schedules.
 - 6. Schedule of Values.

1.03 SUBMITTAL PROCEDURES:

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction

activities to avoid delay.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.
3. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

1.04 PROCESSING:

- A. Allow fourteen (14) calendar days for initial review time so that installation will not be delayed as a result of the time required to process submittals, including a one time (30) day time period for one time re-submittal process. The Architect will promptly advise the Contractor when a submittal being processed must be delayed for coordination
- B. No extension of Contract time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.

1.05 SUBMITTAL PREPARATION:

- A. Place a permanent label for or title on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.
- B. Provide a space to record the Contractor's and Architect's review and appropriate action markings and the action taken.
- C. Include the following information on the label for processing and recording action taken:
 1. Project name and address
 2. Date
 3. Name and address of Architect
 4. Name and address of Contractor
 5. Name and address of subcontractor
 6. Name of manufacturer
 7. Numbering System: Submittals shall be identified by specification section (i.e., 01-08 81 00-0, 01-09 30 00-0, 02-10 14 01-0 etc.) Any re-submittals shall be numbered sequentially according to the original submittal section, followed by the subscript submittal number -1, -2, -3 (i.e., 01-08 81 00 -1, 01-09 30 00 -1, 02-10 14 01 -1 etc.). Submittals and re-submittals shall be kept intact with the original number. Do not add new drawing or information outside the scope of the original submittal, unless specifically requested. Do not assign a new number for a re-submittal.
 8. Reference: List Specification Section number and product reference as a cross-reference for each submittal.

D. Identify each submittal with the following additional identification:

1. Contractor's stamp with initials or signature, certifying to review of submittal, compliance with Contract Documents, coordination with other impacted work, and verification of field measurements.
2. Drawing and Specification Section numbers to which the submittal applies.
3. Subcontractor's or supplier's name and address.
4. Name and telephone number of the individual to contact for additional information regarding the submittal.
5. Whether it is an original or a re-submittal.

E. SUMMARY:

1. This Section specifies administrative and procedural requirements for submittals required for performance of the Work, including:
 - a. Submittal schedule
 - b. Submittal procedures
 - c. Daily construction reports
 - d. Shop Drawings
 - e. Product Data
 - f. Samples
 - g. Manufacturers' instructions
 - h. Manufacturers' certificates

F. Submittal Transmittal:

1. Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Construction Manager using a transmittal form. Submittals received from sources other than the Contractor will be returned without action.

1.06 CONTRACTOR'S CONSTRUCTION SCHEDULE:

- A. Bar-Chart Schedule: Prepare a fully developed, horizontal bar-chart type Contractor's construction schedule per section 01 32 00, Construction Progress Documentation. Submit schedule at pre-construction meeting.

1.07 SUBMITTAL SCHEDULE:

- A. Within thirty (30) calendar days after the Pre-construction Conference, Contractor shall provide a submittal schedule, procurement schedule and a list of submittal priorities in compliance with the General Conditions.

- B. Coordinate submittal schedule with the list of subcontracts, schedule of values and the list of products as well as the Contractor's construction schedule.
- C. Prepare the schedule in chronological order. Provide the following information:
 - 1. Scheduled date for the first submittal
 - 2. Related Section number
 - 3. Event Number associated with CPM Construction Schedule
 - 4. Submittal category
 - 5. Name of subcontractor
 - 6. Description of the part of the Work covered
 - 7. Scheduled date for resubmittal
 - 8. Scheduled date the Architect's final release or approval
- D. Distribution: Following response to initial submittal, print and distribute five (5) copies to the Construction Manager. Submit other copies to subcontractors, and other parties required to comply with submittal dates indicated. Post copies in the Project meeting room and field office.
- E. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.
- F. Schedule Updating: Revise the schedule after each meeting or activity, where revisions have been recognized or made. Issue the updated schedule concurrently with report of each meeting.
- G. Instruct recipients to report promptly any problems anticipated by dates or sequences shown in schedule.

1.08 SUBMITTALS PROCEDURES

- A. Coordinate preparation and processing submittals with performance of construction activities.
- B. Make submittals in groups containing associate items to ensure that information is available for checking each item when received.
- C. Partial submittals may be rejected as not complying with requirements of Contract Documents and Contractor shall be liable for any resulting delays.
- D. Place permanent label or title block on each submittal for identification. Indicate name of entity preparing each submittal in label or title block.
- E. Requests for deviation from Contract Documents must be submitted in accordance with the General Conditions.
- F. Contractor's Review:

1. Review submittals for accuracy, completeness, and conformity with Contract Documents.
 - a. Submittal shall be construed as stipulating Contractor has thoroughly and completely reviewed and coordinated data.
 - b. Submittals which indicate less than Contractor's full compliance will be returned without action.
 - c. Delays caused by failure to comply will not be acceptable basis for extension of Completion Time.

- G. Contractor shall certify that submittals have been reviewed and coordinated by adding the following affidavit to each submittal:

"This submittal has been reviewed and approved by (Name of Contractor) with respect to construction means, methods, techniques, sequences, safety aspect and other contractual obligations incidental to the submittal. The Contractor certifies that they have reviewed and approved not only the dimensions, but also that they have reviewed the submittal for the purpose of coordination with all other submittals as they relate directly or indirectly with the installation of this Work and have not relied solely upon the design documents in granting their approval. The Contractor additionally asserts that they have made all written notations concerning any information within the submittal that do not conform to the Contract Documents."

Signature _____ Date _____

Name Printed _____ Title _____

1. Submittals not certified by being stamped and signed by Contractor will be returned without action, as will submittals which, in the Construction Manager's or Architect's opinion, have not been adequately reviewed and coordinated by the Contractor.
- H. Package each submittal appropriately for transmittal and handling.
- I. Architect's Review:
1. Submittals are reviewed for general conformance with design concept and general compliance with information given in Contract Documents only.
 2. Review of separate item shall not indicate acceptance of assembly of which item is part.
- J. Review shall not relieve Contractor from responsibility for errors or deviations from requirements of Contract Documents.
- K. Submittal Log: Maintain accurate submittal log for duration of Contract. Indicate current status of all submittals at all times. Make submittal log available for the Construction Manager's review upon request.
- L. Resubmittals: Subject to same terms and conditions as original submittal.
1. Claims will not be considered for Contractor's additional time or expense associated with resubmittals.
 2. Architect will accept not more than one resubmittal. Should additional resubmittals be required,

Contractor shall reimburse Owner for Architects account for time spent in processing additional resubmittals at the current hourly rate.

M. Revisions: Make only those revisions required or accepted by Architect.

1.09 DAILY CONSTRUCTION REPORTS

A. Prepare daily construction reports to record manpower of the general contractor and each onsite subcontractor, a summary of progress, high and low temperature, precipitation, contract days expended, CPM activities performed and percent complete for each activity, and other pertinent information. Prepare one report for each workday. Submit the report of the previous day by 8:00 am the following workday.

1.10 SHOP DRAWINGS, PRODUCT DATA, SAMPLES, AND OTHER SUBMITTALS

A. General:

1. Submit only as required by the various Specification Sections. Do not submit shop drawings, product data, samples, or other submittals, unless specifically required.
2. Submit in accordance with the accepted submittal schedule. Send copies of transmittals to the Owner.
3. Submit in the manner and quantities specified hereinafter.
4. Allow a minimum of twenty (20) calendar days for processing by the Construction Manager, Architect, and his/her consultants, as applicable. Some submittals may require more processing time based upon consultant's input and the complexity of the submittal. If certain submittals are critical, they should be so identified at time of submission. If a specific submittal cannot be reviewed and returned within twenty (20) working days, the Architect will develop with the Construction Manager and Contractor a timely "turn-around" that will not impact the construction schedule.

1.11 SHOP DRAWINGS:

- A. Submit in reproducible PDF format to CM for review and distribution to A/E team.
- B. The Architect or his/her consultants, as applicable, will review the Shop Drawings; mark the reproducibles with required revisions; stamp the reproducibles and indicate "No Exceptions Taken", "Make Corrections Noted", "Submit Specified Item", "Revise and Resubmit", or "Rejected", and return the reproducibles. "Revise and Resubmit" or "Rejected" stamps shall not be construed by the Contractor as a valid reason for an extension of time.
- C. Review the returned reproducibles and take appropriate action as indicated.
1. If reproducibles are marked "Revise and Resubmit," make revisions and indicate them with a "cloud," stamp and date, and resubmit in the same manner and number as for the original submittal.
 2. If reproducibles are marked "Rejected," make a new submittal and submit in the same manner and number as for the original submittal.
 3. If reproducibles are marked "No Exceptions Taken" or "Make Corrections Noted", print and distribute copies for Owner and Inspector, as well as those required for Contractor and

Subcontractors.

4. As with the original submittal, review the returned reproducible and take appropriate action as indicated. As specified hereinabove, resubmit and revise until final action by the Architect or his/her consultants, or the Owner's consultants, as applicable. Final action is signified by the markings "No Exceptions Taken," or "Make Corrections Noted," on the returned reproducible.
- D. Following final action by the Architect or his/her consultants, or the Owner's consultants, as applicable, the Contractor shall make copies and distribute as required for accomplishment and inspection of the indicated Work.
- E. Only those Shop Drawings which bear stamps showing final review of the Contractor, Architect, or the Architect's consultants, or the Owner's consultants, as applicable, shall be used.
- F. Reproduction and Mailing Costs: The Contractor shall pay the reproduction and mailing costs of the reproducible and all prints.
- G. Coordination drawings are a special type of Shop Drawing that show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or function as intended.
- H. Preparation of coordination Drawings is specified in Section 01 31 13 - Project Coordination- and may include components previously shown in detail on Shop Drawings or Product Data.
- I. Submit coordination Drawings for integration of different construction elements. Show sequences and relationships of separate components to avoid conflicts in use of space.
- J. Submit newly prepared information, drawn to accurate scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not considered Shop Drawings.
- K. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates, and similar drawings. Include the following information:
- L. Dimensions.
- M. Identification of products and materials included.
- N. Compliance with specified standards.
- O. Notation of coordination requirements.
- P. Notation of dimensions established by field measurement.
- Q. Sheet Size: Except for templates, patterns and similar full-size Drawings, submit Shop Drawings on sheets 30" x 42".
- R. Do not use Shop Drawings without an appropriate final stamp indicating action taken in connection with construction.

1.12 PRODUCT DATA:

- A. Submit quantities as required by the General Conditions and/or individual Specification Sections.
- B. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams and performance curves. Where Product Data must be specially prepared because standard printed data is not suitable for use, submit as "Shop Drawings."
- C. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products, some of which are not required, mark copies to indicate the applicable information. Include the following information:
 - 1. Manufacturer's printed recommendations.
 - 2. Compliance with recognized trade association standards.
 - 3. Compliance with recognized testing agency standards.
 - 4. Application of testing agency labels and seals.
 - 5. Notation of dimensions verified by field measurement.
 - 6. Notation of coordination requirements.
- D. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.
- E. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.
- F. Do not proceed with installation until an applicable copy of Product Data is in the installer's possession.
- G. Do not permit use of unmarked copies of Product Data in connection with construction.

1.13 SAMPLES:

- A. Submit in the size specified in the individual Specification Sections, and in the quantity required to be returned to the Contractor, together with three (3) additional Samples, which will be retained by the Architect or his/her consultants, or the Owner's consultants, as applicable.
- B. Ship samples to the Construction Manager's office, carriage prepaid. Samples to be returned to the Contractor will be shipped, carriage collect.
- C. Submit samples to illustrate functional and aesthetic characteristics of Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- D. Preliminary Submittals:
 - 1. Unless precise color, pattern, and texture or similar characteristic are specifically described, submit full set of choices for material or product.

2. Preliminary submittals will be reviewed and returned with Architect's mark indicating selection and other action.
3. Architect reserves right not to make individual determination or selections until all samples of all materials are submitted.
4. Submit samples of all selected colors, patterns, textures, or other similar characteristics as selected by Architect.
5. Submit number of samples required by Contractor plus three (3), which will be retained.
 - a. Where variation in color, pattern, texture or other characteristics are inherent in material or product, submit multiple units (not less than three (3), that show approximate limits of variations.
 - b. Accepted samples will form standard of comparison for finished Work.
 - c. Defects, and deviations in excess of those in accepted samples, are unacceptable and are subject to rejection of completed Work.
6. Include identification on each sample, with full Project information, including:
 - a. Project name and location
 - b. Manufacturer and supplier
 - c. Name, finish, and composition of material
 - d. Location where material is to be used
 - e. Specification Section number
7. Reviewed samples which may be used in the Work are indicated in individual specification sections.
8. Field Samples: Provide field samples as required by individual sections. Install samples in locations as directed, completed, and finished.
9. Submit samples finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers and materials, color range sets, and swatches showing color, texture, and pattern.
10. Submit Samples for review of kind, color, pattern, and texture, for a final check of these characteristics with other elements, and for a comparison of these characteristics between the final submittal and the actual component as delivered and installed.
11. Maintain sets of Samples, as returned, at the Project site, for quality comparisons throughout the course of construction.
12. Unless noncompliance with Contract Documents provisions is observed, the submittal may serve as the final submittal.
13. Other Submittals: Submit as specified in the individual Specification Sections.

1.14 ARCHITECT'S ACTION:

- A. General: Review by the Architect shall not be construed as a complete check, but only that the general method of construction and detailing is satisfactory. Review shall not relieve the Contractor from responsibility for errors which may exist.
- B. Final Unrestricted Release: Where submittals are marked "No Exceptions Taken," that part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final.
- C. Final-But-Restricted Release: When submittals are marked "Make Corrections Noted" that part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittals and requirements of the Contract Documents; final acceptance will depend upon that compliance.
- D. Returned for Resubmittal: When the submittal is marked "Revise and Resubmit" or "Rejected," do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations and resubmit without delay. Repeat process, if necessary, to obtain a different action mark.
 - 1. Do not permit submittals marked "Revise and Resubmit" or "Rejected" to be used at the Project Site, or elsewhere where Work is in progress.
- E. Revisions: Make all revisions required by the Architect. If the Contractor considers any required revision to be a change, he/she shall so notify the Architect as provided for under "Changes" in the General Conditions. Show each drawing revision by number, date and subject in a revision block on the drawing. Make only those revisions directed or approved by the Architect.
- F. Revisions after approval: When a submittal has been reviewed by the Architect, resubmittal for substitution of materials or equipment will not be considered unless by an acceptable explanation as to why the substitution is necessary.

1.15 PATTERNS AND COLORS

- A. Unless the exact pattern and color of a product are indicated in the Contract Documents, whenever a choice of pattern or color is available for a product, submit accurate color charts and pattern charts to the Architect for his/her review and selection.

1.16 CERTIFICATES OF COMPLIANCE

- A. Submit certificates of compliance with the associated Shop Drawings, Product Data, Samples, and other submittals required for the product.
- B. Submit on 8-1/2" x 11" white paper.
- C. Submit three copies.

1.17 SUBSTITUTION:

- A. Approval required. Reference General Conditions, 'Substitution of Materials', Article GC-45.

1.18 "OR EQUAL":

- A. Where the phrase "or equal" or "or equal as approved by the Architect" occurs in the Contract Documents, do not assume that materials or equipment will be approved as equal unless the item has been specifically approved for this work by the Architect per the General Conditions – Article GC-45 "Substitution of Materials".
- B. The decision of the Architect shall be final.

1.19 DEFERRED SUBMITTALS

- A. Submit samples to illustrate functional and aesthetic characteristics of Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- B. Jurisdictional Approval Required: All deferred submittals must receive a formal "Job Site" approval stamp from the Madera County Building Department (AHJ) prior to the commencement of associated fabrication or installation.
- C. Submission Timeline:
 - 1. Initial Submission to Architect/EOR: No later than thirty (30) calendar days after the Notice to Proceed (NTP).
 - 2. Architect/EOR Review Period: Allow fourteen (14) calendar days for the Architect and Engineer of Record to review.
 - 3. Resubmittal Requirement: If a deferred submittal is returned as "Rejected" or "Revise and Resubmit," the Contractor shall have seven (7) calendar days to address all comments and return the revised package to the Architect.
 - 4. Clean Approval Requirement: Submittals marked "Make Corrections Noted" or "Approved as Noted" are not acceptable for deferred items. The Contractor must incorporate all notes and obtain a final, clean "Approved" or "No Exceptions Taken" stamp from the Architect/EOR before the package is eligible for submission to the AHJ.
 - 5. Submission to AHJ: Within three (3) business days of receiving a clean approval from the Architect, the Contractor shall submit the package to the Madera County Building Department for formal review.
- D. Responsibility for Delay: The Contractor is responsible for the professional coordination of all deferred systems. Any delays resulting from late submissions, the failure to provide a clean resubmittal within seven (7) days, or the failure to obtain AHJ approval prior to scheduled installation shall be considered Contractor-caused delays.
- E. Schedule of Deferred Submittals:
 - 1. Fire Sprinkler System
 - 2. Fire Alarm System

PART 2 - PRODUCTS (not used).

PART 3 - EXECUTION (not used).

END OF SECTION 01 33 00

SECTION 013600

ELECTRONIC DRAWING FILES

PART 1 – GENERAL

1.01 DESCRIPTION

- A. This section describes the limitations of use of any electronic files furnished to the Contractor.

1.02 DRAWING FILES

- A. Drawing files are the original work of the professional Architect and his consultants who retain all ownership rights. As such, they may not be used or reproduced beyond the limits hereinafter described without the expressed written permission of the Architect.
- B. The Architect has no contractual obligation to provide electronic files, however such files may be furnished for the convenience of the Contractor to use in the preparation of shop drawings or to coordinate the work of different trades. Architect may withhold permission to use any or all, electronic files at the sole discretion of the Architect.
- C. Electronic drawing files to be made available to the Contractor shall be limited to background plan type information. Detail drawings and similar files will not be furnished electronically.
- D. At the request of the Contractor, the Architect will furnish a single copy of electronic files to the Contractor in a recent AutoCAD version on appropriate media.
1. The general contractor shall make a single request for files and indicate all files desired for all trades. Requests received from subcontractors will be directed to the General Contractor or ignored.
 2. Contractor shall be responsible for converting files to other formats and for making and distributing copies to subcontractors.
 3. The Architect shall be entitled to reasonable reimbursement from the Contractor for time and materials expended to reproduce more than one copy of the files, or if the Contractor requests additional files not included in the original request.
- E. The Architect and his consultants make no warrantee as to the accuracy, reliability or usefulness of electronic files or information. Contractor use of files shall result in assumption of all risks associated with their use.
- F. Limitations of use:
1. Contractor shall not use or rely upon electronic files as contractual documents. Contractor shall independently field verify and measure all as-built and field conditions and shall not rely upon electronic files for determining clearances and dimensions, for preparing material take-offs, or other critical elements of work.
 2. Contractor shall transfer files to his own title block drawing sheets. Contractor shall not use or print any title blocks, logos or other marks that identify or imply authorship of the Architect or his consultants on any documents created or used by the Contractor. Such use is a violation of the Business and Professions Code and is subject to fines and other legal consequences. Documents produced by the Contractor that contain such

information shall be immediately destroyed.

3. Contractor may use electronic files to prepare shop drawings or to coordinate the work of different trades. Any use of electronic files in a manner that simply reproduces the electronic files for submittal as shop drawings will be rejected without review.

END OF SECTION

SECTION 01 41 00

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Drawings and general provisions of the Contract, including General Conditions and Supplemental General Conditions and other Division 01 General Requirements, apply to this Section.

1.02 SUMMARY:

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements of the Contract Documents and all applicable governing codes. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-control services required by Owner, Construction Manager, Architect, or authorities that have jurisdiction are not limited by provisions of this Section.
- C. Related Sections include the following:
 - 1. Division 1 Section 01 32 00 - "Construction Progress Documentation" for developing a schedule of required tests and inspections.
 - 2. Division 1 Section 01 73 29 - "Cutting and Patching" for repair and restoration of construction disturbed by testing and inspecting activities.
 - 3. Divisions 2 through 40 Sections for specific test and inspection requirements.

1.03 DEFINITIONS:

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by authorized representatives of the Owner.
- C. Testing Laboratory: An independent Testing Laboratory employed by the Owner.

- D. Project Representative: Construction Manager as defined in General Conditions.

1.04 QUALITY ASSURANCE:

- A. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- B. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- C. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- D. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.
- F. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 - 1. Requirement for specialists shall not supersede building codes and similar regulations governing the Work, nor interfere with local trade-union jurisdictional settlements and similar conventions.

1.05 QUALIFICATIONS

- A. Testing Laboratory Qualifications: A Testing Laboratory with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 548, and that specializes in types of tests and inspections to be performed. All samples shall be taken by and tests performed by certified testers employed by the Testing Laboratory.

1.06 LIMITATIONS OF SERVICES

- A. The tests and controls set forth are intended only to be a checklist from which the Construction Manager may select those that are applicable to the specific project.
- B. The Testing Laboratory shall make only those tests and provide only such controls that are set forth in the pertinent Sections of the Specifications and such others as will be specifically designated by the Construction Manager and those otherwise required by building codes and other regulations. Also, the Testing Laboratory shall consult the Construction Manager regarding the extent or limit of such tests and controls, within each category, not inconsistent with such building codes and other regulations.

- C. The Testing Laboratory is not authorized to release, revoke, alter, or enlarge on requirements of the Contract Documents, nor to approve or accept any portion of the work nor to perform any duties of the Contractor.

Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

1.07 CONTRACTOR'S RESPONSIBILITIES

- A. Unless otherwise indicated, provide quality-control services specified and required by authorities having jurisdiction.
- B. Contractor shall cooperate with the Testing Laboratory in providing samples and information for facilitating all of the tests and controls set forth herein, or those selected herefrom by the Construction Manager.
- C. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
- D. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
- E. The Contractor shall cooperate with agencies performing required inspections, tests and similar service and provide reasonable auxiliary services, samples and information for facilitating all of the tests and controls set forth herein. Auxiliary services required include but are not limited to:
 - 1. Providing ready access to the Work and furnishing incidental labor and facilities necessary to facilitate inspections and tests.
 - 2. Make materials required for testing available to the Testing Laboratory and assist in acquiring these materials. Taking adequate quantities of representative samples of materials that require testing or assisting the Testing Laboratory in taking samples, in ample time to allow for Laboratory testing. Do not use materials requiring testing until they have been tested and written approval has been received from the Testing Laboratory.
 - 3. Providing the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
 - 4. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.
 - 5. Security and protection of samples and test equipment at the Project Site.
- F. Arrange for the timely presence and recommendations of the Testing Laboratory representative for the Contractor's field or shop operations such as soils compaction, welding procedures, and similar critical operations, at the start of such operations.
- G. If work, which is required to be tested or inspected, is covered up without prior notice or approval, such work, shall be uncovered at the discretion of the Construction Manager.

- H. Items proposed by the Contractor as substitutions to those specified may require testing, when deemed necessary by the Construction Manager and Architect, to establish equality with the items specified.
 - 1. The Testing Laboratory for making such tests will be selected by the Construction Manager.
 - 2. Costs of tests and preparation of samples shall be borne by the Contractor when such tests are authorized by him/her.
 - 3. Special preparation of sample for testing, if required, shall be done at the source of supply under the direction of the Testing Laboratory.
 - 4. Deliver test specimens to the Testing Laboratory in ample time to avoid job delays.
 - 5. Specimens shall bear similar approvals, labels, and identifications as those for the specified item.
 - 6. At the option of the Construction Manager, the Contractor shall furnish certificates of compliance, at no cost to the Owner, from suppliers or manufacturers in lieu of performing tests.
 - 7. The Construction Manager will designate the items in this category.
- I. Unless otherwise directed, materials not conforming to the requirements of the Contract Documents shall be promptly removed from the job site.

1.08 LABORATORY'S DUTIES

- A. Perform specified sampling and testing of materials.
 - 1. Comply with specified standards.
 - 2. Ascertain compliance of materials with requirements of the Contract.
- B. Promptly notify Construction Manager, Architect, Construction Inspector, and Contractor of observed irregularities and deficiencies in the Work and in products to be used in the Work.
- C. After each inspection and test promptly submit one copy of certified written laboratory report to the following:
 - 1. Owner.
 - 2. General Contractor.
 - 3. Inspector.
 - 4. Architect.
 - 5. Construction Manager.
 - 6. Structural Engineer (Related tests and inspections)
 - 7. Mechanical, Plumbing and Electrical Engineers (Related tests and inspections).
- D. Each report shall include:
 - 1. Date issued.
 - 2. Project title and number.
 - 3. Testing Laboratory name, address, and telephone number.
 - 4. Name and signature of laboratory inspector.
 - 5. Date and time of sampling and testing.
 - 6. Record of temperature and weather conditions.
 - 7. Date of test.
 - 8. Identification of product and specification section.
 - 9. Location of sample or test in the project.

10. Type of test.
 11. Results of tests and compliance with the Contract.
 12. Interpretation of test results when requested by the Construction Manager.
 13. Signed by a Registered Civil Engineer licensed in the State of California.
- E. Submit a final report of special test and inspections at Notice of Completion, which includes a list of unresolved deficiencies.
- F. Interpret tests and inspections and state in each report whether tested and inspected Work complies with or deviates from the Contract Documents.
- G. Retesting required because of nonconformance to the specified requirements shall be performed by the same Testing Laboratory.
- H. Arrange with the Construction Manager for the delivery of samples of items requiring testing, in ample time to allow for analysis and testing.
- I. Arrange for the timely presence and recommendations of a Testing Laboratory representative for the Contractor's field or shop operations such as soils compaction, welding procedures, and similar critical operations, at the start of such operations.
- J. Promptly notify Architect, Construction Manager, and Contractor of irregularities or deficiencies in the Work observed during performance of Testing Laboratory's services. Immediately upon Testing Laboratory determination of a test failure, the Laboratory will telephone the results to the Construction Manager and Contractor. On the same day, Laboratory will send written test results to those named on above distribution list.
- K. Laboratory shall be licensed to conduct testing and inspection operations in California.

PART 2 - PRODUCTS (not used)

PART 3 – EXECUTION

3.01 TEST SELECTION

- A. The Contractor shall be responsible for, and shall pay for, all off-site and on-site tests except for the following:
1. Earthwork: Field and Laboratory tests of soil used for fill and earth backfill as placed and compacted. Inspect placing of fill and backfill and determine conformance to compaction requirements.
 2. Aggregate base and asphalt paving.
 3. Reinforcing for concrete and masonry.
 4. Concrete quality control.
 5. Masonry mortar and grout.
 6. Full time masonry inspection.
 7. Welding inspections and tests.

8. Structural steel.
 9. Expansion anchor pull-out.
 10. Deck Welding.
 11. Spray applied fireproofing.
- B. The Contractor shall notify the Construction Manager in writing (3) three working days in advance of time for the above-named tests.

3.02 REPAIR AND PROTECTION:

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes.
1. Provide materials and comply with installation requirements specified in other Sections of these Specifications. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching.
 2. Comply with the Contract Document requirements for Division 1 Section "Cutting and Patching."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 41 00

SECTION 01 43 39

MOCK-UPS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Supplemental General Conditions and other Division 01 General Requirements, apply to this Section.

1.02 SUMMARY

- A. Mock-Up requirements are intended to establish general configuration and scope.
- B. When Mock-Up is required, perform no installation or application until Mock-Up is reviewed.
- C. Submit schedule for Mock-Up construction. Show date and relationship to reviewed Construction Schedule.
- D. Construct Mock-Up for review by Construction Manager, Owner, and Architect for compliance to requirements of the Contract Documents, approval of color, texture, finish quality and detail.
- E. Construct Mock-Ups on site, except as otherwise specified, at location indicated or otherwise approved by Construction Manager.
- F. Construct Mock-Ups required by individual Specification Sections.
- G. Assemble and erect Mock-Ups as scheduled at the end of this Section.
- H. Modify or replace Mock-Up until Mock-Up is accepted.
- I. Approved Mock-Up:
 - 1. Shall remain until the remainder of the work of the Section requiring Mock-Up is complete.
 - 2. Will be used as the standard of acceptable quality for the remainder of the Project.
 - 3. May be incorporated into the work at the discretion of the Construction Manager, except as otherwise noted.
 - 4. Shall be removed at the completion of the work of that Section when required by Section or when not incorporated into the work.

1.03 SUBMITTALS

- A. Mock-Up Review Report
 - 1. Submit report indicating status of compliance of reviewed Mock-Up with requirements of Contract Documents.
 - 2. Indicate all deviations from requirements of Contract Documents. If there are no deviations, indicate that Mock-Up is in complete compliance.

3. Failure to indicate Mock-Up deviations may result in withdrawal of acceptance.
4. Change Order, based on report, will be issued to include allowed deviations.

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Provide all required fastenings, bracings and supports.
- B. Erect plumb and true to lines and levels, firmly erected and anchored to adjacent materials and substrate.
- C. Install components under provisions of applicable Sections.
- D. Notify Construction Manager upon completion of Mock-Up construction and make arrangements for review.
- E. Modify the Mock-Up and construct new components as required by Construction Manager to secure acceptance.

3.02 CLEAN-UP

- A. Remove Mock-Ups specified to be removed or not incorporated into the work when directed by Construction Manager. Clear area after Mock-Up has been removed.

END OF SECTION 01 43 39

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Drawings and general provisions of the Contract, including General Conditions and Supplemental General Conditions and other Division 01 General Requirements, apply to this Section.

1.02 SUMMARY:

- A. This Section specifies requirements for temporary facilities and controls, including utility, construction and support facilities, and security and protection. Furnish and install all required temporary facilities and controls as shown or specified herein plus such facilities as required for proper performance of the Contract. All such temporary facilities and controls shall be located where directed and re-located as required by the progress of the work and maintained in a safe and sanitary condition at all times until completion of the Contract.
- B. Contractor shall be responsible for all of its own office and construction utilities including the cost of permits, usage, generation, installation, relocation, distribution, metering, maintenance, safety, disposal, and removal. Coordinate this work with the Construction Manager.
- C. Coordinate installation and removal of temporary utilities with Construction Manager, utility companies, other contractors, and authorities having jurisdiction. Contractor shall submit plans to the Construction Manager for approval of proposed temporary utilities and facilities.
- D. Do not install or remove any temporary utility without prior written approval by Construction Manager. Construction Manager's written approval does not guarantee or warrant that utilities installed by the Contractor will not require relocation in the future due to the follow-on and/or sequence of work by Contractor or other contractors or by changes in scope and sequence of work by the Owner.
- E. Temporary utilities placed underground shall be permanently marked as to prevent damage by others, and accurately located for removal. Damage to above ground and underground utilities by the Contractor or others shall be repaired or replaced by the Contractor at no cost to the Owner.
- F. Temporary utilities include, but are not limited to, the following:
 - 1. Water service and distribution
 - 2. Electric power service
 - 3. Lighting
 - 4. Telephone service
 - 5. Internet Service
- G. Support facilities include, but are not limited to, the following:
 - 1. Project identification and temporary signs

2. Waste disposal facilities
 3. Temporary heat and ventilation
 4. Field offices and storage boxes
 5. Sanitary facilities, including drinking water
 6. Temporary enclosures, fencing and barricades
 7. Construction aids and miscellaneous services and facilities
 8. Storm water control and drainage
- H. Security of the buildings shall be maintained at all times. Security and protection facilities include, but are not limited to, the following:
1. Environmental protection
 2. Security enclosure and lockup
 3. Temporary fire protection
 4. Barricades, warning signs, lights
 5. Shoring and scaffolding
- I. Removal of Temporary Facilities
- Remove temporary facilities and controls, including associated materials and equipment, when their use is no longer required.
- Restore and recondition areas of the site damaged and disturbed by temporary facilities and controls and their installation.
3. Remove and properly dispose of debris resulting from removal and reconditioning operations.
- J. Submittals
- Temporary Utilities: Submit reports of tests, inspections, meter readings and similar procedures performed on temporary utilities.
2. Implementation and Termination Schedules: Submit a schedule indicating implementation of each temporary utility within 15 days of the date established for commencement of the Work.

1.03 USE CHARGES:

- A. General: Cost or use charges for temporary facilities are not chargeable to Owner, Construction Manager or Architect and shall be included in the Contract Sum. Contractor shall be responsible for his/her own temporary power and for coordination with Pacific Gas and Electric Company (PG&E) for that temporary power service. Multiple temporary power services to the site may be required due

to availability of power. Allow other entities to use temporary services and facilities without cost, including, but not limited to, the following:

1. Owner's Representatives
2. Inspection and/or Testing agencies
3. Personnel of authorities having jurisdiction

1.04 QUALITY ASSURANCE:

- A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including but not limited to:
 1. Building Code requirements
 2. Health and safety regulations
 3. Utility company regulations
 4. Police, Fire Department and Rescue Squad rules
 5. Environmental protection regulations.
- B. Standards: Comply with NFPA Code 241, "Building Construction and Demolition Operations", ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition", and NECA Electrical Design Library "Temporary Electrical Facilities."
 1. Trade Jurisdictions: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with trade regulations and union jurisdictions.
 2. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70 and applicable codes.
 3. Refer to Guidelines for Bid conditions for Temporary Job Utilities and services prepared jointly by AGC and ASC for industry recommendations.
- C. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.05 PROJECT CONDITIONS:

- A. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:
 1. Keep temporary services and facilities clean and neat
 2. Relocate temporary services and facilities as required by progress of the Work
 3. Operate in a safe and effective manner
 4. Take necessary fire prevention measures
 5. Do not overload facilities, or permit them to interfere with progress

6. Do not allow hazardous dangerous or unsanitary conditions, or public nuisances to develop or persist on the Site.
7. Allow free use and access of all utilities at all times to all entities contracted to perform the Work.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. General: Provide new materials. Undamaged, previously used materials in serviceable condition may be used if approved by the Construction Manager. Provide materials suitable for use intended. Provide specified utility services required during construction and extend temporary service lines to construction areas to allow use by all trades, and subcontractors.
- B. Paint: Comply with requirements in Section 09 91 00 "Painting".
 1. For sign panels and applying graphics, provide exterior grade alkyd glass enamel over exterior primer.
- C. Tarpaulins: Provide waterproof, fire-resistant, UL labeled tarpaulins with flame spread rating of fifteen (15) or less. For temporary enclosures provide translucent nylon reinforced laminated polyethylene or polyvinyl chloride fire retardant tarpaulins.
- D. Water: Provide potable water approved by local health authorities.
- E. For fences and vision barriers, provide exterior type, minimum 3/8" thick plywood.
 1. For safety barriers, sidewalk bridges and similar uses provide minimum 5/8" thick exterior plywood.

2.02 EQUIPMENT:

- A. General: Provide equipment and materials suitable for use intended.
- B. Field Offices: Provide mobile units with lockable entrances, operable windows, serviceable finishes, heated, air conditioned and on foundations adequate for normal loading. Comply with all applicable codes and requirements.
- C. Fire Extinguishers: Hand carried, portable, UL rated. Provide class and extinguishing agent as indicated or a combination of extinguishers of NFPA-recommended classes for exposures.
 1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.
- D. Temporary Toilet Units: Provide a sufficient number of self-contained single-occupant toilet units of the chemical, aerated recirculation, or combustion type, properly vented and fully enclosed with a glass fiber reinforced polyester shell or similar nonabsorbent material. Units shall be accompanied by hand washing stations, including paper towels and covered trash receptacles in accordance with governing regulations.
- E. Drinking-Water Fixtures: Containerized, bottled-water drinking-water units, including paper cup supply.

1. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 deg F (7.2 to 12.7 deg C).
- F. Electrical Outlets: Properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-V plugs into higher-voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light.
 - G. Power Distribution System Circuits: Where permitted and overhead and exposed for surveillance, wiring circuits, not exceeding 125-V ac, 20-A rating, and lighting circuits may be nonmetallic sheathed cable.
 - H. Electrical Power Cords: Provide grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress.
 - I. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered glass enclosures, where fixtures are exposed to breakage. Provide exterior fixtures were exposed to moisture.
 - J. Trash removal: The Contractor shall be responsible for providing trash receptacles. He/she shall be responsible for the removal of debris from the job site and shall keep all work areas and passageways in and around the project free from debris. Collect waste from construction areas daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than seven (7) days during normal weather or three (3) days when the temperature is expected to rise above eighty (80) deg F (27 deg C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material in a lawful manner. Owner trash facilities may not be used. If, in the Construction Manager's opinion, the contractor has not performed due diligence in keeping the site clean on a weekly basis, monies will be withheld from the contractor's monthly progress payment in the maximum amount of \$1,000.00 per weekly occurrence. This notification will come from the Construction Manager in writing. These accumulated monies will be released to the contractor in the contractor's next pay application upon verification by the Construction Manager that the site has been cleaned.
 - K. First Aid Supplies: Comply with governing regulations.
 - L. Water Hoses: Provide 3/4" heavy-duty, abrasion-resistant, flexible rubber hoses one hundred feet long (100'), with pressure rating greater than the maximum pressure of the water distribution system; provide adjustable shut-off nozzles at hose discharge.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL:

- A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.02 TEMPORARY UTILITY INSTALLATION:

- A. General: Engage appropriate local utility company to install temporary service or connect to existing service. Where utility company provides only part of the service, provide the remainder with matching, compatible materials, and equipment. Comply with utility company recommendations.
1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
 2. Provide adequate capacity at each stage of construction. Before temporary utility is available, provide trucked-in services.
 3. Obtain easements to bring temporary utilities to Project site where Owner's easements cannot be used for that purpose.
 4. Arrange with electric utility service company to provide service for power and lighting for temporary field offices. Pay costs for service and power used.
 5. Distribute electric power and lighting.
 6. Provide lighting and convenience outlets in the temporary structures, and as otherwise required for the performance of the Work.
 7. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to the Construction Manager, change over from use of temporary service to use of the permanent service.
 8. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities or permit them to interfere with progress. Do not allow hazardous dangerous or unsanitary conditions, or public nuisances to develop or persist on the site.
- B. Water Service: Existing well to be demolished at the North East portion of the site is available in its existing condition for Contractor's use for temporary construction water, prior to demolishing. Contractor shall be responsible for all work and associated costs to make the well operable.
1. Contractor may connect to existing water point of connection for their use. Contractor is responsible for flushing and sterilizing new and existing piping prior to connection. Owner is not responsible for any damage to Contractor's system or equipment due to inadequate flushing or sterilization of existing piping.
 2. Provide water for construction purposes.
 3. Install branch piping with taps located so that water for demolition, grub, clear, compaction, and construction purposes is available throughout the Work by the use of hoses. Protect piping and fitting against freezing.
 4. Make potable water available for human consumption.
- C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
1. Locate as approved by the Construction Manager.

2. Provide containers to remove and dispose of effluent off the site in a lawful manner.
- D. Electric Power Service: Contractor may tap into site electrical service at the existing Building 2 main electrical room. Contractor must install power meter for monitoring construction power.
- E. Electric Distribution: Provide receptacle outlets adequate for connection of power tools and equipment in quantity, size and type acceptable for each phase of the Work.
- F. Telephone Service: Provide temporary telephone service throughout construction period for common-use facilities used by all personnel engaged in construction activities.
1. Provide one telephone and one facsimile machine (FAX) in each Contractor's field office and pay costs for installation, maintenance, service, and removal.

3.03 SUPPORT FACILITIES INSTALLATION:

- A. General: Comply with the following:
 1. Locate field offices, storage sheds, sanitary facilities, and other temporary construction and support facilities as directed by the Construction Manager.
 2. Provide noncombustible construction for offices, shops, and sheds located within thirty (30) feet of building lines. Comply with NFPA 241.
 3. Maintain support facilities until Completion as necessary. Remove upon completion of the Contractor's final contract milestone and written approval by the Construction Manager. Personnel remaining after Notice of Completion may be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Temporary Heat and Ventilation: Provide temporary heat required by construction activities, for curing or drying of completed installations or protection of installed construction from adverse effects of low temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce the ambient condition required and minimize consumption of energy. Provide forced ventilation of enclosed areas for proper installation and curing of materials, to disperse humidity, and to prevent hazardous accumulations of dust, fumes, vapors and gases. Pay the costs of installation, maintenance, operation, and removal of temporary heat and ventilation, including costs for fuel consumed, required for the performance of the Work.
- C. Storage and Fabrication Sheds: Install storage and fabrication sheds, sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility services. Sheds may be open shelters or fully enclosed spaces within the designated building site.
- D. Toilets: Provide self-contained single-occupant toilet units of the chemical, aerated recirculation, or combustion type, properly vented and fully enclosed with a glass fiber reinforced polyester shell or similar nonabsorbent material. Units shall be accompanied by hand washing stations, including paper towels and covered trash receptacles in accordance with governing regulations.
 1. Provide toilet tissue, paper towels, paper cups and similar disposable materials for each facility. Provide covered waste containers for used material.

E. Drinking Water Fixtures: Provide drinking water as required by OSHA, including paper supply.

- F. Temporary Enclosures: Provide temporary enclosures for protection of construction in progress and completed, from exposure, foul weather, other construction operations and similar activities.
1. Install tarpaulins securely, with incombustible wood framing and other materials. Close openings of twenty-five (25) square feet or less with plywood or similar materials.
 2. Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with venting and material drying and curing requirements to avoid dangerous conditions and effects
- G. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Containerize and clearly label hazardous, dangerous, or unsanitary waste materials separately from other waste. Comply with Division 1 Section 2.09 C.4 "Housekeeping" and Article 3.05 of this section for progress cleaning requirements.
1. If required by authorities having jurisdiction, provide separate containers, clearly labeled, for each type of waste material to be deposited.
 2. Develop a waste management plan for Work performed on Project. Indicate types of waste materials Project will produce and estimate quantities of each type. Provide detailed information for on-site waste storage and separation of recyclable materials. Provide information on destination of each type of waste material and means to be used to dispose of all waste materials.

3.04 SECURITY AND PROTECTION FACILITIES INSTALLATION:

- A. Except for use of permanent fire protection as soon as available, do not change over from use of temporary security and protection facilities to permanent facilities until requested by the Construction Manager.
- B. Temporary Fire Protection: Until fire protection needs are supplied by permanent facilities, install and maintain temporary fire protection facilities, including but not limited to, water truck or water storage tank, fire hoses, nozzles and fire extinguishers. Comply with NFPA 10 "Standard for Portable Fire Extinguishers," and NFPA 241 "Standard for Safeguarding Construction, Alterations and Demolition Operations."
1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one (1) extinguisher for every seventy-five (75') of travel.
 2. Store combustible materials in containers in fire-safe locations.
 3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways and other access routes for fighting fires. Prohibit smoking in hazardous fire exposure areas.
 4. Provide fire extinguisher access and supervision welding operations and similar sources of fire ignition.
 5. Provide water truck or other means to provide temporary fire protection until such time as permanent fire protection is in service.
- C. Permanent Fire Protection: At the earliest feasible date in each area of the Project, complete installation of the permanent fire protection facility, including connected services, and place into

operation and use. Instruct key personnel on use of facilities.

- D. Barricades, Warning Signs and Lights: Comply with standards and code requirements for the erection of structurally adequate barricades. Paint with appropriate colors, graphics and warning signs to inform personnel and the public, of the hazard being protected against. Where appropriate and needed provide lighting, including flashing red or amber lights.
- E. Environmental Protection:
 - 1. Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result.
 - 2. Avoid use of tools and equipment which produce harmful noise.
 - 3. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons in or near the site.
 - 4. Erosion and Sediment Control: Prepare and implement a comprehensive erosion and sediment control program. Perform daily cleanup of mud and dust carried onto street surfaces by construction vehicles. Throughout excavation, haul trucks shall use tarpaulins or other effective covers. Upon completion, use effective measures to reduce wind erosion. Perform replanting and repaving operations as soon as practicable after site grading.
 - 5. Air Quality / Dust Control:
 - a. Indoor Operations: Control dust resulting from indoor construction operations by localizing it to greatest possible extent using temporary partitions, curtains, or other means which will prevent spread of dust beyond immediate work area. Duct openings and other openings communicating with other parts of building shall have effective temporary closures.
 - b. Outdoor operations: Provide dust control as required to abate any dust nuisance on or adjacent to Project Site. Apply water by means of approved sprinkling equipment, water wagons, or spray from hoses, to extent and amount required at any time that dust control is necessary, as determined by the City or Construction Manager. Use of chemicals, oil or other such materials will not be permitted.
- F. Provide and maintain suitable temporary barriers as required to prevent public entry; protect the work and existing facilities, persons, and trees and plants from damage or injury from construction operations.
- G. Preserve and protect existing trees, irrigation, all landscaping, and plants not designated or required to be removed, and those adjacent to the site. As required, provide barriers to a minimum height of 6'-0" around each tree and plant, or around groups in proximity of construction operations.

3.05 CLEANING DURING CONSTRUCTION:

- A. Contractor shall dispose of all material off-site, in a lawful manner. Do not allow the accumulation of scraps debris, waste material and other items not required for construction of this work. Remove waste materials and rubbish not less than on a weekly basis and dispose of at Contractor's expense.

- B. Clean interior areas prior to start of finish work, maintain areas free of dust and other contaminants during finishing operations.
- C. Provide adequate storage for all items awaiting removal from the job site, observing all requirements for fire protection and protection of the ecology.
- D. Each sub-contractor shall clean up the results of his/her work and deliver such debris to areas designated for holding by Prime Contractor.
- E. Weekly, and more often if necessary, sweep all interior spaces clean. "Clean", for the purpose of this sub-paragraph, shall be interpreted as meaning free from dust and other materials capable of being removed by reasonable diligence using a hand-held broom.
- F. Following the installation of finish floor materials, clean the finish floor and provide adequate protection. Inspect protection daily (or more often if necessary) while work is being performed in the space in which finish materials have been installed. "Clean", for the purpose of this sub-paragraph, shall be interpreted as meaning free from all foreign materials which, in the opinion of the Construction Manager or Architect, may be injurious to the finish floor material.

3.06 OPERATION, TERMINATION AND REMOVAL:

- A. Maintenance: Maintain facilities in good operating condition until removal. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a twenty-four (24) hour/day basis where required to achieve indicated results and to avoid the possibility of damage.
- B. Termination and Removal: Unless the Construction Manager requests that it be maintained longer, remove each temporary facility when the need has ended, or when replaced by the authorized use of a permanent facility, or no later than the Final Billing. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged work, clean exposed surfaces and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are property of the Contractor. The Owner reserves the right to take possession of the Project identification signs.
 - 2. Prior to Notice of Completion, clean and renovate permanent facilities that have been used during the construction period, including but not limited to:
 - a. Replace air filters and clean the inside of ductwork and housings.
 - b. Replace significantly worn parts and parts that have been subject to unusual operating conditions as determined by the Construction Manager.
 - c. Replace lamps that are burned out or noticeably dimmed by substantial hours of use.

3.07 TREE AND PLANT PROTECTION

- A. Preserve and protect existing trees, plants and grapevines which are not designated or required to be removed, and those adjacent to the site.
- B. Consult with the Construction Manager prior to removal of roots and branches which interfere with

demolition and construction operations. Remove only those items agreed upon in writing with the Construction Manager.

- C. Provide barriers to a minimum height of 6' around each tree and plant, around each group of trees and plants, as applicable, in the proximity of demolition and construction operations.
- D. In the proximity of root zones of trees and plants:
 - 1. Prohibit vehicular traffic and parking.
 - 2. Prohibit storage of materials and equipment.
 - 3. Prevent dumping of refuse and chemically injurious materials and liquids.
 - 4. Prevent puddling and continuous running water.
- E. Carefully supervise excavating, grading, and filling, and subsequent construction operations, to prevent damage.
- F. At no increase in Contract Sum, replace, or suitably restore trees and plants designated to remain which are damaged or destroyed as a result of demolition and construction operations.
- G. Remove and lawfully dispose of soil that has been contaminated during the performance of the Work by oil, solvents, and other materials which could be harmful to trees and plants, and replace with good soil, at no increase in Contract Sum. Provide manifests for removed soil to Construction Manager.

3.08 SECURITY

- A. Secure, maintain, and protect the Work, stored materials, equipment, and temporary facilities until time of Final Completion, or such earlier time as Owner may choose to assume such responsibility.
- B. Security and protection may be by any legal method, or combination of methods, acceptable by the Construction Manager.

3.09 TEMPORARY CONTROLS

- A. Noise and Vibration:
 - 1. Equipment and impact tools shall have intake and exhaust mufflers.
 - 2. Secure written permission from the Construction Manager at least three (3) working days prior to using noisy and vibratory equipment, such as jackhammers, concrete saws, impact tools, and high-frequency electrical equipment.
 - 3. Cooperate with the Owner and/or Construction Manager if the use of noisy and vibratory equipment becomes objectionable by its longevity.
- B. Dust and Dirt:
 - 1. Conduct demolition and construction operations to minimize the generation of dust and dirt, and prevent dust and dirt from interfering with the progress of the Work and from accumulating in Work and adjacent areas.

2. To additionally minimize the generation of dust and dirt, hauling equipment and trucks carrying loads of soil and debris shall have their loads sprayed with water or covered with tarpaulins.
 3. Prevent dust and dirt from accumulating on walks, roadways, parking areas, and planting, and from washing into sewer and storm drain lines.
 4. Periodically water exterior demolition and construction areas to minimize the generation of dust and dirt.
- C. Water: Do not permit surface and subsurface water and other liquids to accumulate in or about the Project site and vicinity thereof. Should such conditions develop, control the water or other liquid, and suitably dispose of it by means of temporary pumps, piping, drainage lines, troughs, ditches, dams, or other methods.
- D. Pollution:
1. No burning of refuse, debris, or other materials shall be permitted on or in the vicinity of the Project site.
 2. Comply with applicable regulatory requirements and anti-pollution ordinances during the conduct of construction and disposal operations.
- E. Pest Control: Take necessary provisions to control rodents, insects, and other pests.

3.10 PROJECT IDENTIFICATION AND SIGNS

- A. General:
1. Contractor shall have provisions in their contract to provide a 4'-0" x 8'-0" project identification sign with graphics and verbiage given to them by the Construction Manager. No other language or graphics will be permitted the sign other than what is approved by the Construction Manager. Contractor shall construct and maintain, at the contractors cost, this identification sign throughout the entire course of the project. Location of the sign will be provided by the Construction Manager.
 2. Signs other than the specified Project sign will not be permitted, unless otherwise approved in advance by the Construction Manager. No Contractor signs or banners are allowed on the temporary fence.

3.11 SITE CONTROLS AND PARKING

- A. Entrance to Work Site: Contractor and his/her employees shall use certain access roads or entrances as indicated on attached drawing or as directed by Construction Manager. Maintain these roads in satisfactory condition during Contract time, and repair damages attributable to Work of this Project at intervals as needed. At completion of Contract, roads and entrances shall be left in condition at least equal to that existing at start of Contract, except as may be otherwise required by Contract Documents.
- B. Site Storage and Work Areas: Construction Manager will allocate available on-site storage and work areas to Contractor, subject to change as may be necessary by job progress such as site development or other intervening Work.

- C. Regulations: Observe and comply with rules and regulations in effect at occupied facilities, including, but not restricted to, parking and traffic regulations, security restrictions, hours of access, etc.
- D. Use of Public Sidewalks and Streets: Make arrangements with local authorities including Traffic Engineer, for temporary use of streets and sidewalks for offices, shops, storage, etc. Abide by County rules, regulations, and ordinances. Obtain permits and pay all required fees.

END OF SECTION 01 50 00

SECTION 01 55 00

TRAFFIC REGULATION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS:

- A. Drawings and general provisions of the Contract, including General Conditions and Supplemental General Conditions and other Division 01 General Requirements, apply to this Section.

1.02 SUMMARY

- A. This section describes procedures for traffic regulation during construction in public streets and highways.

1.03 STANDARD SPECIFICATIONS

- A. Wherever reference is made to the State Specifications and Plans, such reference shall mean the State of California, Business and Transportation Agency, Department of Transportation Agency, Department of Transportation Standard Specification and Plans, 2006 edition for English units.

1.04 SUBMITTALS

- A. The Contractor shall submit a traffic control plan prior to start of construction operations, prepared, signed, and sealed by a California licensed civil or traffic engineer to the Construction Manager for review and approval. Preparation of any additional traffic control plans or detail that may be required by other agencies during the course of the work shall be the Contractor's responsibility.

1.05 GENERAL

- A. Provide safe and continuous passage for pedestrian and vehicular traffic at all times.
- B. Control traffic at those locations indicated and in conformance with the approved traffic control plans and specifications.
- C. Furnish, construct, maintain, and remove detours, road closures, traffic signal equipment, lights, signs, barricades, fences, K-rails, flares, solar-powered flashing arrow signs, miscellaneous traffic devices, flagmen, drainage facilities, paving, and such other items and services as are necessary to adequately safeguard the public from hazard and inconvenience. All such work shall comply with the ordinances, directives, and regulations of authorities with jurisdiction over the public roads in which the construction takes place and over which detoured traffic is routed by the Contractor. After devices have been installed, the Contractor shall, at his/her own expense, maintain and keep them in good repair and working order until no longer required. The Contractor shall also pay the cost of replacing such devices that are lost or damaged, to such an extent as to require replacement, regardless of the cause of such loss or damage.
- D. Prior to the start of construction operations, notify the City of Madera and County of Madera giving the expected starting date, completion date, and the names and telephone numbers of two responsible persons who may be contacted at any hour in the event of a condition requiring immediate emergency service to remove, install, relocate, and maintain warning devices. In the event these persons do not promptly respond, or the authority deems it necessary to call out other forces to accomplish emergency service, the Contractor will be held responsible for the cost of such emergency service.

- E. The Contractor shall obtain and pay all fees for Permit(s) required by City of Madera or County of Madera pertaining to traffic regulation.

1.06 TRAFFIC CONTROL DEVICES AND SIGNS

- A. Traffic control devices and temporary striping shall conform to the State Standards Plans and Specifications. Construction signs shall conform to the latest edition of the State of California Sign Specification Sheets.
- B. The placement of construction signing, striping, barricades, and other traffic control devices used for handling traffic and public convenience shall conform to the latest edition of the State of California, Department of Transportation, "Manual of Traffic Controls for Construction and Maintenance Work Zones" and the Caltrans Manual Section 5 2006 (revision 1) edition.
- C. Signs shall be illuminated or reflectorized when they are used during hours of darkness. Cones and portable delineators used for night lane closures shall have reflective sleeves. Barricades used in the diversion of traffic shall be equipped with flashers if they are in place during hours of darkness.
- D. During the duration of a detour, cover all existing signs not in accordance with the traffic control plan. Existing signs which are in force shall be relocated to provide visibility from all relocated traffic lanes.

1.07 VEHICULAR TRAFFIC CONTROL

- A. Accomplish construction in phases by detouring traffic from its normal patterns. Restore traffic to normal patterns in each phase before proceeding to the next phase. Traffic control plan shall be approved by City of Madera.
- B. Transition traffic lane transitions from permanent lanes to construction zone patterns in accordance with the requirements for the normal posted speed limit and as shown in the drawings.
- C. Unless otherwise shown in the drawings or allowed by Madera County, limit construction activities to 7a.m. to 5 p.m. Monday through Friday. Return roadways and sidewalks to unrestricted vehicle and pedestrian usage when construction is not underway.

1.08 ACCESS TO ADJACENT PROPERTIES

- A. Maintain reasonable access from public streets to adjacent properties at all times during construction. Prior to restricting normal access from public streets to adjacent properties, notify each property owner or reasonable person, informing him of the nature of the access restriction, the approximate duration of the restriction, and the best alternate access route for that particular property.

PART 2 – PRODUCTS (not used)

PART 3 – EXECUTION (not used)

END OF SECTION 01 55 00

SECTION 015700

SPECIAL PROJECT PROCEDURES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Supplemental General Conditions and other Division 01 General Requirements, apply to this Section.

1.02 SUMMARY

- A. The following Special Project Procedures shall be developed, enacted, and maintained throughout the course of construction by the Contractor. These requirements are in addition to those specified within the Contract General Conditions, and include: Environmental Protection Plan, Smoke / Odor Control, Noise Control, Dust and Air Pollution Control, Welding and Burning, Erosion Control, Storm Water, Disposal Operations, Cultural Resources.

1.03 ENVIRONMENTAL PROTECTION PLAN

- A. The area of work shall be kept in an organized and clean condition to protect both the on-site and off-site environment during the progression of the Work.
- B. Contractor shall develop an Environmental Protection Plan and submit for the Construction Manager's review within 30-days from the Notice to Proceed. The approved Plan shall be implemented and distributed to the employees of the Contractor, as well as the Contractor's subcontractors, suppliers, and materialmen. The Environmental Protection Plan shall include, but not be limited to, the following items:
 - 1. Copies of required permits.
 - 2. Proposed sanitary landfill site.
 - 3. Other proposed disposal sites.
 - 4. Noise control.
 - 5. Dust control.
 - 6. Erosion control.
 - 7. State General Construction Activity Storm Water Permit (Contractor shall obtain permit and administer all requirements).
- C. The Contractor shall be solely responsible for all construction operations undertaken to complete the project. Any construction operation or activity shall comply with all federal, state, and local requirements pertaining to water, air, solid waste and noise pollution.
- D. For the purpose of this Plan the following definitions apply:
 - 1. Sediment: Soil, sand, silt, clay, and/or other debris that have been eroded and transported by runoff water.
 - 2. Solid Waste: Any solid matter such as refuse, wood residues, sand, rubbish, debris, garbage, and other discarded solid materials resulting from construction activities, maintenance and/or repair work. Solid waste also includes organic matter such as leaves, and tree trimmings.
 - 3. Chemical Waste: Includes any petroleum-based products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, disinfectants, organic chemicals, and inorganic wastes. Some of these wastes may be classified as "hazardous" materials.
 - 4. Sanitary Wastes
 - a. Sewage: Domestic sanitary sewage.
 - b. Garbage: Refuse and scraps resulting from food preparation, including cooking, dispensing, and consumption of food.
 - 5. Hazardous Materials: Should the Contractor detect site materials that are believed to be asbestos, polychlorinated biphenyl (PCB), or other such hazardous material, the Contractor shall stop the work in the proximate area and immediately notify the Construction Manager in

writing. Work in the affected area shall not be resumed pending an investigation to determine if the questionable material is indeed hazardous resulting in one of the following accommodations: 1) the material has been abated; 2) the material has been identified as non-hazardous, or 3) the material has been rendered harmless.

E. Protection of natural resources

1. General: It is intended of the Contract Documents that the natural resources scheduled to remain within the project boundaries and outside the limits of permanent work performed under this contract be preserved in their existing condition or be restored to an equivalent condition upon completion of the Work. The Work shall be confined to the work area limits shown on the drawings. Upon completion of the work return adjacent surfaces disturbed and not altered by the work defined by the Contract Documents to their pre-construction elevations and general appearance.
2. Land Resources: Do not remove, cut deface, injure or destroy trees, shrubs, or landscape areas outside the work area limits. Do not remove, deface injure or destroy trees within the work area scheduled to remain without written permission from the Construction Manager. Should damage to existing landscape occur the Contractor at its expense shall remove and/or replace the damaged landscape at the sole discretion of the Owner.
3. Water Resources: The Contractor shall investigate and comply with all applicable federal, state, and local regulations concerning the discharge, whether directly or indirectly of pollutants to underground and natural waters. At all times, special measures shall be taken to prevent oily or other hazardous substances from entering the ground, drainage areas or local bodies of water in such quantities as to affect normal use, aesthetics or produce a measurable impact upon the area. Any soil or water that is contaminated with oily substances due to the Contractor's operations shall be disposed of in accordance with applicable regulations at the Contractor's expense. Perform all work under this Contract in such a manner that any adverse environmental impacts are reduced to a level that is acceptable to the applicable regulatory agency(s).

1.04 SMOKE / ODOR CONTROL

- A. Primary fresh air intakes to existing adjacent buildings must be protected from exhaust gases from internal combustion engines, paint and solvent fumes, and any other noxious fumes and vapors. Protection of adjacent building fresh air intakes must be accomplished in a manner that will not interfere with the functionality of the air intake systems.
- B. The Contractor must implement control methods such as snorkels or other mechanical means from engines exhausts to a minimum of 50 feet away from adjacent building air intakes.
- C. Any other fume generating activities must be limited to a minimum distance of 50 feet away from any adjacent building air intake grille.
- D. In the event that fume generating activities must occur within 50 feet of an adjacent building air intake the Contractor will be required to complete the work as follows:
 1. Notify the Construction Manager in writing at least 14 days in advance of the scheduled work.
 2. Complete the work when it least impacts Owner activities, (i.e., evenings, weekends, or favorable wind conditions); or,
 3. Provide filter media, plastic barriers, or other control methods to assure that only fresh air enters the adjacent building ventilation system.

1.05 NOISE CONTROL

- A. Maximum noise levels within 500 feet of any business or adjacent building area shall not exceed 90 dBA at a distance of 50 feet as measured under the noisiest operation conditions for equipment components such as trenchers, pavers, graders, and trucks. The maximum noise level for all other equipment shall not exceed 85 dBA at 50 feet under the same conditions.

- B. Jackhammers shall be equipped with exhaust mufflers and steel muffling sleeves when noise levels exceed the above limits. Air compressors should be of a quiet type such as a "whisperized" compressor, and all compressor hoods shall be closed while the equipment is in operation. If necessary, provide portable noise barriers constructed of ¾-inch plywood lined with 1-inch-thick fiberglass on the work side around jackhammering activities.
- C. Keep noisy equipment as far as possible from noise-sensitive site boundaries. Machines should not be left idling. The Contractor is encouraged to use electric power in lieu of internal combustion engine powered tools and equipment wherever possible.
- E. The Contractor shall schedule noisy operations so as to minimize their duration at any given location, and to minimize disruption to the adjoining business and building occupants. Notify the Construction Manager in advance of performing work creating unusual noise and schedule such work at times mutually agreeable to the Owner and Construction Manager.
- F. Operation of musical equipment such as radios, DVD players, tape players, television, and other similar items at the construction site is forbidden.

1.06 DUST AND AIR POLLUTION CONTROL

Enlist measures to avoid the creation of dust and air pollution.

- A. Dust and Dirt Control: Comply with following Mitigation Measures from the San Joaquin Valley Air Pollution Control District (SJVAPCD) CEQA Guidance Document "Guide for Assessing and Mitigating Air Quality Impacts" (GAMAQI) Table 6-2:
 - 1. All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer / suppressant, covered with a tarp or other suitable cover or vegetative ground cover.

At a minimum unpaved area shall be wetted a minimum of three times a day or as frequently as necessary to eliminate dust formation. When wind velocity exceeds 15 mph the site shall be watered as frequently as necessary to eliminate dust migration.
 - 2. All land clearing, grubbing, scraping, excavation, land leveling, grading, cut & fill, and demolition activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking.
 - 3. All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at the end of each workday. (The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions.) (Use of blower devices is expressly forbidden.)
 - 4. Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant.
 - 5. Trucks hauling soil, sand, debris, garbage, or other similar loose materials to and from the site shall be covered.
 - 6. Trackout shall be immediately removed when it extends 50 or more feet from the site and sweep area streets adjacent to the project as necessary, but no less than once per workday to eliminate as much as practicable the tracking of dirt and debris offsite.
- B. Air Pollution Control
 - 1. All volatile liquids, including fuels and solvents shall be stored in closed containers.

- 2. Debris, refuse, lumber, and/or other scrap material burning is forbidden.
- 3. Properly maintain equipment to reduce gaseous pollutant emissions.
- B. Cover stockpiles of soil, debris, sand or other similar loose materials to prevent migration.
- C.

1.07 WELDING AND BURNING

- A. Eliminate welding and burning of steel as much as possible. Where unavoidable, perform welding and burning with all possible precaution to avoid fire hazards. Provide a fire watch for a minimum of 45 minutes after burning stops. Provide protection for all adjacent materials and /or surfaces.

1.08 STORM WATER / EROSION CONTROL

- A. Contractor shall obtain a State General Construction Activity Storm Water Permit and shall administer all requirements, including, but not limited to the development and implementation of the Storm Water Pollution Prevention Plan (SWPPP) and Best Management Practices (BMP) for the project.

1.09 DISPOSAL OPERATIONS

- A. Solid Waste Management: Supply solid waste transfer containers at various site locations as necessary to keep the site free of construction debris and garbage. Debris such as spent air filters, oil cartridges, cans, bottles, combustibles, and litter shall be placed in appropriate containers and routinely removed from the jobsite. The Contractor shall take measures to prevent trash and papers from blowing onto adjacent property.
- B. Washing of concrete trucks/containers where wastewater may reach adjacent property, storm drains or natural watercourses will not be permitted. Remove any excess concrete to the sanitary landfill.
- C. Chemical Waste and Hazardous Materials: Furnish containers for storage of spent chemicals used during construction operations. Dispose of chemicals and hazardous materials in accordance with applicable regulations.
- D. Garbage: Store garbage in covered containers and dispose of contents to a lawful sanitary landfill at routine intervals or as necessary to prevent the accumulation of on-site trash.
- E. Dispose of vegetation, weeds, rubble, and other materials removed during demolition, clearing, and stripping operations to a suitable off site disposal site in accordance with applicable regulations.
- F. Excavated Materials: Remove from the site any spoil material that is in excess of that required for backfill and such excavated material unsuitable for backfill. Excess backfill material shall be hauled off site and no additional compensation will be paid to the Contractor for such off haul. Unsuitable excavated material shall be disposed of off site in accordance with applicable regulations to a site identified in the Environmental Plan immediately following excavation.

1.10 PROTECTION OF CULTURAL RESOURCES

- A. Protection of Cultural Resources:
 - 1. In the event any historic surface or subsurface archaeological features or deposits, including locally darkened soil ("midden"), that could conceal cultural deposits, animal bone, shell, obsidian, mortars, or human remains, are uncovered during construction, work within 100 feet of the find shall cease and a qualified archaeologist shall be contacted by the County to determine if the resource is significant. If the find is determined to be of significance, resources (such as grinding stones and mano fragments) shall be donated to an appropriate cultural center.

2. When Native American archaeological, ethnographic, or spiritual resources are involved, all identification and treatment shall be conducted by qualified archaeologists who are either certified by the Society of Professional Archaeologists (SOPA) or meet the federal standards as stated in the Code of Federal Regulations (36 CFR 61), and Native American representatives who are approved by the local Native American community as scholars of their cultural traditions.

In the event that no such Native American is available, persons who represent tribal governments and/or organizations in the locale in which resources could be affected shall be consulted. When historic archaeological sites or historic architectural features are involved, all identification and treatment is to be carried out by historical archaeologists or architectural historians. These individuals shall meet either SOPA or 36 CFR 61 requirements.

3. If human bone or bone of unknown origin is found during construction, all work shall stop in the vicinity of the find and the County Coroner shall be contacted immediately. If the remains are determined to be Native American, the Coroner shall notify the Native American Heritage Commission who shall notify the person it believes to be the most likely descendent. The most likely descendent shall work with the contractor to develop a program for reinterment of the human remains and any associated artifacts. No additional work is to take place within the immediate vicinity of the find until the identified appropriate actions have been carried out.
4. The Owner may retain an Archaeologist to monitor and/or recover data and artifacts during the construction work.
5. All items found or recovered considered to have archaeological significance are the property of the Owner.

END OF SECTION

SECTION 01 61 00

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Supplemental General Conditions and other Division 01 General Requirements, apply to this Section.

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements governing the Contractor's selection of products for use in the Project.
- B. The Contractor's Construction Schedule is included in Section 01 32 00, "Construction Progress Documentation"; and the Schedule of Submittals is included under Section 01 33 00, "Submittals."
- C. Administrative procedures for handling requests for substitutions are included under Section 01 25 00, "Substitutions."

1.03 DEFINITIONS

- A. Definitions used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms. Such terms are self-explanatory and have well recognized meanings in the construction industry.
 - 1. "Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - a. "Named Products" are items identified by manufacturer's product name, including make or model designation, indicated in the manufacturer's published product literature, that is current as of the date of the Contract Documents.
 - 2. "Materials" are products that are substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
 - 3. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections such as wiring or piping.

1.04 DESCRIPTION

- A. Material and equipment incorporated in the Work shall be:
 - 1. New, unless otherwise specified.
 - 2. In a condition acceptable to the Owner and the Architect.
 - 3. Suitable for the use intended.
 - 4. In conformance with EPA codes and regulations and applicable air quality control district.
- B. No material or equipment shall be used for any purpose other than that for which it is designed or specified.

- C. No material shall contain asbestos.
- D. No materials or products shall contain formaldehyde in excess of the amount recommended by the State of California Department of Health Services (DOHS).

1.05 TRANSPORTATION AND HANDLING

- A. Deliver manufactured products in the manufacturer's original, unbroken containers or packaging, with identifying labels intact and legible.
- B. Immediately on delivery, inspect shipments to assure compliance with the requirements of the Contract Documents and reviewed submittals, and to verify that products are properly protected and undamaged.
- C. Handle products in a manner to avoid soiling and damaging the products and their packaging.
- D. Promptly remove damaged and defective products from the site and replace at no increase in Contract Sum.

1.06 STORAGE

- A. Store manufactured products in accordance with the manufacturers' printed instructions, with seals and labels intact and legible.
 - 1. Store products subject to damage by the elements in weathertight enclosures.
 - 2. Maintain temperature and humidity within the ranges specified by the manufacturers.
- B. Exterior Storage:
 - 1. Store fabricated products above the ground, on blocking or skids, to prevent soiling and staining.
 - 2. Cover products which are subject to deterioration with impervious sheet coverings; provide adequate ventilation to avoid condensation.
 - 3. Store loose granular material in a well-drained area on solid surfaces to prevent mixing with foreign matter.
- C. Arrange storage to facilitate inspection.
- D. Periodically inspect stored products to assure that products are maintained under specified conditions and free from damage and deterioration.
- E. Protection After Installation:
 - 1. Provide substantial coverings as necessary to protect installed products from damage from traffic and construction operations. Remove coverings when no longer needed.
 - 2. Maintain temperature and humidity conditions for interior equipment and finish products in accordance with the manufacturers' printed instructions.

1.07 PRODUCT OPTIONS

- A. For products indicated or specified only by reference standard, select any product meeting such standard.

- B. For products indicated or specified by naming several products or manufacturers, select any one (1) of the products or manufacturers named which complies with the specified requirements.
- C. For products indicated or specified by naming only one (1) product and manufacturer, there is no option.
- D. Products not meeting the criteria hereinabove, shall be considered Substitutions, and shall be submitted as specified under Section 01 25 00 "Substitutions".
- E. "Or accepted equal" means a product accepted in writing by the Architect prior to bid opening for use in the Work as being equivalent in essential attributes to the product indicated or specified in the Contract Documents. Reference Section 01 25 00 "Substitutions".

1.08 QUALITY ASSURANCE

- A. Source Limitations: To the fullest extent possible, provide products of the same kind, from a single source.
- B. Compatibility of Options: When the Contractor is given the option of selecting between two or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.
- C. Each Contractor is responsible for providing products and construction methods compatible with products and construction methods of other Contractors.
- D. If a dispute arises between Contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.
- E. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view in occupied spaces or on the exterior.
 - 1. Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface that is not conspicuous.
 - 2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface which is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:
 - a. Name of product and manufacturer.
 - b. Model and serial number.
 - c. Capacity.
 - d. Speed.
 - e. Ratings.

1.09 OWNER-FURNISHED, CONTRACTOR-INSTALLED (OFICI) PRODUCTS

- A. Risk of Loss: The Contractor's responsibility for OFCI products commences upon the Contractor's written acceptance of the delivery from the Owner's carrier. From that point until the Notice of Completion, the Contractor assumes full risk of loss or damage.
- B. Receiving and Inspection:

1. Contractor shall provide at least five (5) business days' notice to the Construction Manager and Owner prior to the required delivery date of OFCI items.
 2. Contractor shall provide labor and equipment to unload OFCI products at the project site.
 3. Joint Inspection: Contractor, Construction Manager, and Owner shall jointly inspect shipments for damage and completeness. Contractor shall document any discrepancies or damage on the bill of lading and notify the Owner in writing within 24 hours.
- C. Storage and Protection:
1. Contractor shall store and protect OFCI products in accordance with the requirements of Articles 1.05 and 1.06 of this Section.
 2. Costs for providing climate-controlled storage for OFCI items, if required by the manufacturer, shall be included in the Contract Sum.

PART 2 PRODUCTS

2.01 PRODUCT SELECTION

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are new and undamaged and unused at the time of installation.
1. Provide products complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.
 2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.
- B. Product Selection Procedures: Product selection is governed by the Contract Documents and governing regulations, not by previous Project experience.
1. Visual Matching: Where Specifications require matching an established Sample, the Architect's decision will be final on whether a proposed product matches satisfactorily.
 - a. Where no product available within the specified category matches satisfactorily and also complies with other specified requirements, comply with provisions of the Contract Documents concerning "Substitutions" for selection of a matching product in another product category, or for noncompliance with specified requirements.
 2. Visual Selection: Where specified product requirements include the phrase "...as selected from manufacturer's standard colors, patterns, textures..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Architect will select the color, pattern and texture from the product line selected.
- C. Owner-Furnished Products:
1. Products furnished by the Owner are identified in Section 01 11 00, "Summary of Work."
 2. Contractor's receipt of OFCI products does not relieve the Contractor of the duty to provide all auxiliary materials, fasteners, and accessories necessary for a complete and functional installation as required by Paragraph 2.01.A.1.

PART 3 EXECUTION

3.01 INSTALLATION OF PRODUCTS

- A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other Work.
 - 1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Notice of Completion.

END OF SECTION

SECTION 016500

STARTING OF SYSTEMS

PART 1 – GENERAL

1.1 Section Includes

- A. Starting systems.
- B. Demonstration and instructions.
- C. Testing, adjusting, and balancing.

1.2 Related Sections

- A. Quality Control: Manufacturers field reports.
- B. Contract Closeout.

1.3 Starting Systems

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Construction Manager seven (7) days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence or other conditions that may cause damage.
- D. Verify that tests, meter readings and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of responsible manufacturer's representative in accordance with manufacturers' instructions.
- G. When specified in individual specifications sections, require manufacturer to provide authorized representative to be present at site to inspect, check and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report in accordance with Quality Requirements that equipment or system has been properly installed and is functioning correctly.

1.4 Demonstration and Instructions

- A. Demonstrate operation and maintenance of Products to Owner personnel minimally two weeks prior to date of Substantial Completion.
- B. Demonstrate Project equipment and instruct in a classroom environment located at the site and instructed by a qualified representative who is knowledgeable about the Project.
- C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner personnel in detail, to explain all aspects of operation and maintenance.
- D. Demonstrate start-up, operation, control, adjustment, troubleshooting, servicing, maintenance,

and shutdown of each item of equipment at scheduled times, at designated location.

- E. All demonstrations and training sessions of equipment/products/systems by qualified personnel shall be videotaped or recorded on DVD by the Contractor. Two copies of the videotape or DVD shall be provided to the Owner.
- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- G. The amount of time required for instruction on each item of equipment and system is that specified in individual sections.

PART 2 - PRODUCTS

Not used

PART 3 - EXECUTION

Not used

END OF SECTION

SECTION 01 71 23

FIELD ENGINEERING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Supplemental General Conditions and other Division 01 General Requirements, apply to this Section.

1.02 DESCRIPTION

- A. Layout and install the Work to the lines and grades indicated and specified.
- B. Retain and pay expenses of a qualified engineer or land surveyor to establish on the site the required reference points and benchmarks, establish building lines and elevations, check structural steel framework for plumbness, and establish on steel frame the required basic grid lines from which Work of other sections shall be laid out.

1.03 QUALIFICATIONS OF ENGINEER OR SURVEYOR

- A. The engineer or land surveyor shall be licensed in the State of California and shall be acceptable to the Owner.

1.04 SURVEY REFERENCE POINTS

- A. Existing basic horizontal and vertical control points for the project are indicated.
- B. Locate and protect control points prior to starting site Work and preserve permanent reference points during construction.
 - 1. Make no changes or relocations without prior authorization from the Construction Manager.
 - 2. Report to the Construction Manager if a reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations.
 - 3. Require land surveyor to replace control points which become lost or destroyed, base replacements on original survey control.

1.05 PROJECT SURVEY REQUIREMENTS

- A. Establish lines and levels; locate and layout:
 - 1. Site Improvements:
 - a. Stakes for grading, fill and topsoil placement.
 - b. Utility slopes and invert elevations.
 - 2. Batter boards for structures.
 - 3. Building foundations, column locations.

4. Controlling lines and levels required for mechanical and electrical work.

B. From time to time verify layouts to ensure accuracy.

1.05 RECORDS

A. Maintain a complete, accurate log of control and survey Work as it progresses.

1.06 SUBMITTALS

A. Submit name and address of civil engineer and land surveyor.

B. Upon request, submit documentation to verify accuracy of field engineering Work.

C. Submit record documents under provisions of Section 01 77 19.

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION (not used)

END OF SECTION 01 71 23

SECTION 01 73 29

CUTTING AND PATCHING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General Conditions and Supplemental General Conditions and other Division 01 General Requirements, apply to this Section.

1.02 SUMMARY:

This Section specifies administrative and procedural requirements for cutting and patching.

- . Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work. See also S0"
- C. Divisions 2 through 40 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
 - 1. Requirements of this Section apply to mechanical and electrical installations. Refer to Division 22 through Division 28 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

1.03 DEFINITIONS

- A. Cutting: Removal of existing construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after Installation of other Work.

1.04 SUBMITTALS:

- A. Cutting and Patching Proposal: Where approval of procedures for cutting and patching is required before proceeding, submit a proposal describing procedures well in advance of the time cutting and patching will be performed and request approval to proceed. Include the following information, as applicable, in the proposal:
- B. Describe the extent of cutting and patching required and how it is to be performed; indicate why it cannot be avoided.
- C. Describe anticipated results in terms of changes to in-place construction; include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.
- D. List products to be used and firms or entities that will perform work.
- E. Indicate dates when cutting and patching is to be performed.
- F. List utilities that will be disturbed or affected, including those that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.

- G. Construction Managers approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.
- H. Where cutting and patching involves addition of reinforcement to structural elements, submit details and engineering calculations signed and sealed by a structural engineer licensed to practice in the State of California to show how reinforcement is integrated with the original structure.
- I. Review of the Contractor's submittal by the Engineer to proceed with cutting and patching does not waive the Engineer's right to later require complete removal and replacement of a part of the Work found to be unsatisfactory.

1.05 QUALITY ASSURANCE:

- A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio.
- B. Obtain approval of the cutting and patching proposal before cutting and patching the following structural elements:
 - 1. Foundation construction.
 - 2. Bearing Walls
 - 3. Structural concrete.
 - 4. Equipment supports.
 - 5. Piping, duct work, vessels and equipment.
 - 6. Structural steel
 - 7. Structural wood
 - 8. Lintels
 - 9. Structural Decking
 - 10. Misc structural metals
 - 11. Operational and Safety Limitations: Do not cut and patch operational elements or safety related components in a manner that would result in reducing their safety to perform as intended, or result in increased maintenance, or decreased operational life or safety.
- C. Obtain approval of cutting and patching proposal before cutting and patching the following operating elements or safety related systems:
 - 1. Primary operational systems and equipment.
 - 2. Control systems.
 - 3. Communication systems.

4. Electrical wiring systems.
 5. Operational systems of special construction in Division 13 Sections.
- D. Miscellaneous Elements: Do not cut and patch the following elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
1. Water, moisture, or vapor barriers.
 2. Membranes and flashings.
 3. Exterior curtain-wall construction.
 4. Equipment supports.
 5. Piping, ductwork, vessels, and equipment.
 6. Noise- and vibration-control elements and systems
- E. Visual Requirements: Do not cut and patch work exposed on the exterior or in occupied spaces, in a manner that would, in the County's Construction Engineer's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace Work cut and patched in a visually unsatisfactory manner.
1. If possible, retain original installer or fabricator to cut and patch exposed Work listed below. If it is impossible to engage original Installer or fabricator, engage another recognized experienced, and specialized firm. Contractor will be responsible to warranty all work.
 - a. Processed concrete finishes.
 - b. Stonework and stone masonry.
 - c. Ornamental metal.
 - d. Matched-veneer woodwork.
 - e. Preformed metal panels.
 - f. Roofing.
 - g. Firestopping.
 - h. Window wall system.
 - i. Stucco and ornamental plaster.
 - j. Terrazzo.
 - k. Finished wood flooring.
 - l. Fluid-applied flooring.
 - m. HVAC enclosures, cabinets, or covers.

1.06 WARRANTY

- A. General Warranty: The Contractor shall warrant all cutting and patching work against defects in materials and workmanship for a period of one (1) year from the date of Substantial Completion.
- B. Performance Guarantee: The Contractor shall guarantee that all patched areas meet the following standards for the duration of the warranty period:
1. Visual Integrity: Patched surfaces shall remain free of visible cracks, blisters, or peeling. Finished surfaces must maintain a seamless match to adjacent undisturbed surfaces in color, texture, and plane.

2. Structural Integrity: Patches in structural elements (slabs, shear walls, foundations, etc.) shall show no signs of settling, shifting, or separation from the original substrate.
 3. Weather-tightness: Any patching performed on the building enclosure (roofing, siding, waterproofing, or flashings) shall remain 100% weather-tight and leak-free.
 4. System Continuity: Patches in fire-rated assemblies, acoustic barriers, or vapor membranes shall maintain the certified rating and continuity of the original system.
- C. Corrective Work: Upon written notification of a failure in a patched area, the Contractor shall, at no additional cost to the Owner, perform necessary repairs to restore the area to the standard of the original Contract Documents. All corrective work, including the restoration of affected finishes, must be completed within fourteen (14) calendar days of notification.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Use materials that are identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials whose installed performance will equal or surpass that of existing materials.

PART 3 - EXECUTION

3.01 INSPECTION:

- A. Before cutting existing surfaces, examine surfaces to be cut and patched and action before proceeding, if unsafe or unsatisfactory conditions are encountered.
- B. Before proceeding, meet at the site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

3.02 PREPARATION:

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.
- C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Take all precautions necessary to avoid cutting existing pipe, conduit or duct work serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them

3.03 PERFORMANCE:

- A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete work without delay.
 1. Cut existing construction to provide for installation of other components or performance of

other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.

B. Cutting: Cut existing construction using methods least likely to damage elements to be retained or adjoining construction. Where possible review proposed procedures with the original installer; comply with original installer's recommendations.

1. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
3. Cut through concrete and masonry using a cutting machine that is appropriate for the work to be done.
4. Comply with requirements of applicable Sections of Division 31 where cutting and patching requires excavating and backfilling.
5. By-pass utility services such as pipe and conduit, before cutting, where services are shown or required to be removed, relocated or abandoned. Cut-off pipe or conduit in walls or partitions to be removed. Cap valve or plug and seal the remaining portion of pipe and conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.
6. Patch with durable seams that are as invisible as possible. Comply with tolerances.
7. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
8. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction to break of plane in a manner that will eliminate evidence of patching and refinishing.
9. Where removal of walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance. Replace wall coverings to break of plane if required for match.
10. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing patch, after patched area has received prime and base coat.
11. Ceilings: Patch, repair, or re-hang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
12. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weather-tight condition.

3.04 CLEANING:

A. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove completely paint, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit, and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION

SECTION 01 74 00

CLEANING DURING CONSTRUCTION & FINAL CLEANING

1.01 GENERAL

- A. This section includes cleaning during construction and final cleaning on completion of the work.
- B. At all times maintain areas covered by the Contract and adjacent properties and public access roads free from accumulations of waste, debris, and rubbish caused by construction operations.
- C. Conduct cleaning and disposal operations to comply with local ordinances and antipollution laws. Do not burn or bury rubbish or waste materials on project site. Do not dispose of volatile wastes, such as mineral spirits, oil, or paint thinner, in storm or sanitary drains. Do not dispose of wastes into streams or waterways.
- D. Use only cleaning materials recommended by manufacturer of surface to be cleaned.

1.02 CLEANING DURING CONSTRUCTION

- A. During execution of work, clean site, adjacent properties, and public access roads and dispose of waste materials, debris, and rubbish to assure that buildings, grounds, and public properties are maintained free from accumulations of waste materials and rubbish.
- B. Wet down dry materials and rubbish to lay dust and prevent blowing dust.
- C. Provide containers for collection and disposal of waste materials, debris, and rubbish.
- D. Cover or wet excavated material leaving and arriving at the site to prevent blowing dust. Clean the public access roads to the site of any material falling from the haul trucks.

1.03 SITE CLEANING PRIOR TO LANDSCAPING

Remove concrete, concrete wash, stucco splatter, gunite overspray, and all other wastes and debris prior to final grading and landscaping.

1.04 FINAL CLEANING

- A. At the completion of work and immediately prior to final inspection, clean the entire project site as follows.
- B. Clean, sweep, wash, and polish all work and equipment including finishes.
- C. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed interior and exterior finished surfaces, polish surfaces.
- D. Repair, patch, and touch up marred surfaces to match adjacent surfaces.
- E. Broom clean paved surfaces; rake clean landscaped areas.
- F. Remove from the site all temporary structures and all materials, equipment, and appurtenances not required as a part of, or appurtenant to, the completed work.

END OF SECTION

SECTION 01 77 19

PROJECT CLOSEOUT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Requirements apply to this Section.

1.02 SUMMARY:

- A. This Section specifies administrative and procedural requirements for project closeout, including but not limited to:
 - 1. Inspection procedures
 - 2. Project record document submittal
 - 3. Operation and Maintenance Data
 - 4. Instruction of Owner's personnel
 - 5. Service and maintenance contracts
 - 6. Submittal of guarantees/warranties and bonds
 - 7. Final Cleaning
 - 8. Restoration of damaged and remedial work
 - 9. Delivery of extra materials
- B. Process individual buildings, site package and landscape package separately for project closeouts.

1.03 FINAL COMPLETION:

- A. Preliminary Procedures: Before requesting inspection for certification of Final Completion, complete the following. List exceptions in the request.
 - 1. In the Application for Payment that coincides with, or first follows, the date Final Completion is claimed, show 100 percent (100%) completion for the portion of the Work claimed as complete. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of charges to the Contract Sum.
 - a. If 100 percent (100%) completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
 - 2. Advise Construction Manager of pending insurance changeover requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.

4. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities; include occupancy permits, operating certificates and similar releases.
 5. Complete final clean up requirements, including touch-up painting. Touch up and otherwise repair and restore marred exposed finishes.
- B. Inspection Procedures: On receipt of a request for inspection, the Construction Manager will either proceed with inspection scheduling or advise the Contractor of unfilled requirements. The Construction Manager will prepare the Notice of Completion following inspection or advise the Contractor of construction that must be completed or corrected before the Notice will be issued.
1. The Construction Manager will repeat inspection scheduling when requested and assured that the Work has been completed.
 2. Results of the completed inspection will form the basis of requirements for final acceptance.

1.04 FINAL ACCEPTANCE:

- A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.
1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
 2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
 3. Submit a certified copy of the Construction Manager's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance and the list has been endorsed and dated by the Construction Manager.
 4. Submit record drawings, damage or settlement survey, property survey, and similar final record information.
 5. Submit consent of surety to final payment.
 6. Submit a final liquidated damages settlement statement.
 7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
- B. Re-inspection Procedure: The Construction Manager will reinspect the Work upon receipt of notice that the work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to the Construction Manager.
1. Upon completion of reinspection, the Construction Manager will prepare a Notice of Completion, or advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final completion.
 2. If necessary, the reinspection procedure will be repeated.

1.05 RECORD DOCUMENT SUBMITTALS:

- A. General: Do not use record drawings for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for the Owner, Construction Manager reference during normal working hours.
- B. Record Drawings: Maintain clean undamaged set of prints of Contract Drawings and Shop Drawings. Mark the set in the manner approved in advance by the Construction Manager to show the actual installation where the installation varies from the Work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date. Label each document "PROJECT RECORD" in large, neat, printed letters. Failure to maintain record drawings shall result in withholding of Contractor's payment. See provisions in Section GC-2.23 – Payment, located in the General Conditions.
 - 1. Mark record sets with red erasable pencil; use other colors to distinguish between variations in separate categories of the Work.
 - 2. Mark information that is important to the Owner but was not adequately shown on Contract Drawings or Shop Drawings.
 - a. Changes made by Change Order and other modifications described in the GENERAL CONDITIONS noting the change or modification source.
 - b. Locations of significant Work concealed inside the building whose general locations have been changed from those shown on the Contract Documents
 - c. Locations of items, not necessarily concealed, which have been changed, with the Architect's prior written approval, from the location shown on the Contract Documents.
 - d. Revisions to routing of piping and conduit.
 - e. Revisions to electrical circuitry.
 - f. Actual equipment locations.
 - g. Ducting Size and routing.
 - 3. Note related Change Order or Work Authorization number where applicable.
 - 4. Organize Record Drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on cover of each set.
 - 5. Keep up to date during entire progress of the Work and furnish additional drawings as necessary for clarification. Failure to maintain record drawings shall result in withholding of Contractor's payment. See provisions in Section GC-23 – 'Payment', located in the General Conditions.
 - 6. Record deviations from the sizes, locations, and other features of installations shown in the Contract Documents.
 - 7. Establish locations of underground Work by Global Positioning Systems (GPS) and

reference invert elevations and rates of fall.

8. Give sufficient information to locate Work concealed in the building.
9. Locate main runs of piping, conduit, ductwork and similar items by dimensions.
10. Locate other items either by dimensions or in relation to spaces within the building.
11. Where feasible, the individual or entity that obtained record data, whether the individual or entity is the installer, subcontractor, or similar entity, is required to prepare the mark-up on Record Drawings.
12. Accurately record information in an understandable drawing technique.
13. Record data as soon as possible after it has been obtained. In the case of concealed installation, record and check the mark-up prior to concealment.

C. As-Built Drawings:

1. At time of acceptance of the Work and prior to final payment, using the record drawings for reference, prepare "As-Built" drawings on permanent, transparent, reproducible prints furnished by the Architect. Furnish reproducible record drawings, made from final Shop Drawings, which have been updated to show actual conditions, for Work specified in the individual Specification sections. Where Shop Drawings are marked, show cross-reference on "As Built" Drawings.
 - a. Employ and pay a professional draftsman to prepare the "As-Built" drawings from the record drawings, using typical drafting devices and recording information in ink clouding all changes.
 - b. After completing the preparation of transparency record drawings, produce three (3) copies of each Drawing, whether or not changes and additional information were recorded. Organize the copies into manageable sets. Bind each set with durable paper cover sheets, with appropriate identification, including titles, dates, and other information on cover sheets.
 - c. Organize and bind original marked-up set of prints that were maintained during the construction period in the same manner.
 - d. Organize record mylar transparencies into sets matching the print sets. Reverse roll and place these sets in durable tube-type Drawing containers with end caps. Mark the end cap of each container with suitable identification.
 - e. Sign and date the completed Project "As Builts" and transmit them to the Construction Manager, who will forward them to the Owner after final acceptance of the Work.

D. Large-Scale Coordination Drawings:

1. The preparation of large-scale, detailed coordination drawings will be required for the Work of Divisions 22, 23, 26, 27, 28 and 31 of these Specifications. These coordination drawings are not Shop Drawings as defined by the General Conditions, but, together with Shop Drawings or coordination drawings of other affected Work, are used to check, coordinate, and integrate the various types of Work.

2. If furnished, include the coordination drawings as part of the Project "As-Built".
- E. As-Built Construction Schedule:
1. Using as a basis the latest, updated Progress Schedule required by Section 01 33 00 "Submittals," prepare and transmit a Record Construction Schedule to indicate the actual dates and durations of the various construction activities.
- F. Record Specifications: Maintain one (1) complete copy of the Project Manual, including addenda, and one (1) copy of other written construction documents such as Change Orders and modifications issued in printed form during construction. Mark these documents to show substantial variations in the actual Work performed in comparison with the text of the Specifications and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation. Note related record drawing information and Product Data.
1. Mark each Specification SECTION to record:
 - a. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually incorporated in the Work.
 - b. Changes made by Change Order and other modifications described in the GENERAL CONDITIONS
- G. Operation and Maintenance Manuals: Organize operating and maintenance data into suitable sets of manageable size. Bind properly indexed data into individual heavy-duty 2-inch, 3-ring vinyl-covered binder, with pocket folders for folded sheet information. Mark the appropriate identification on front spine of each binder. Provide index near front of binder furnishing immediate information as to locations in the manual of all emergency data regarding the equipment included in the manual. Provide entire contents of Binder on Compact Disc organized in same sequence as binder.
1. Include the following types of information:
 - a. Emergency instructions
 - b. Spare parts list
 - c. Copies of warranties
 - d. Wiring diagrams
 - e. Recommended maintenance schedules and a list of maintenance performed during the construction process.
 - f. Inspection procedures
 - g. Shop drawings and product data
 - h. Fixture lamping schedule.
 - i. Complete nomenclature of replaceable parts, their part numbers, current cost and name and address of nearest source of parts.

- j. Copy of each guarantee/warranty and service contract issued for the equipment included in the manual.
 - k. Delete Extraneous Data from manufacture's catalog pages, information, which is not applicable to this project installation.
 - l. Video tape of Training Procedures
- 2. Submittal Schedule: Comply with the following schedule for submittal of operating and maintenance manuals.
 - a. Before submittal of Request for Final Payment, when each installation that requires submittal of operating and maintenance manuals is nominally complete, submit two (2) draft copies of each manual to the Construction Manager for review. Include a complete index or table of contents.
 - b. The Construction Manager will return one (1) copy of the draft with comments within fifteen (15) days of receipt.
 - c. Submit one (1) copy of the manuals in final form at least fifteen (15) days before final inspection. This copy will be returned within fifteen (15) days after Final Inspection, with comments.
 - d. After final inspection, make corrections or modifications to comply with the Construction Manager's comments. Submit the specified number of copies of each approved manual to the Construction Manager within fifteen (15) days of receipt of Construction Manager's comments
- H. Operation Tests
 - 1. Conduct systematic start-up and operational tests as required to demonstrate that all systems have been completed and are in compliance with all requirements of the Contract Documents, and are fully functioning and operational. Contractor shall coordinate his/her start-up and operational tests with contractors performing work under other bid packages.
 - 2. Furnish a written record of test results using recording type instruments where applicable
- I. Upon completion of the Work, submit Close out Documents to the Construction Manager for the Owner's records.
- J. Transmit manuals in the quantity which is required to be returned, plus the following, unless otherwise specified, which will be retained by the Construction Manager for forwarding to the Owner after acceptance of the work.
 - 1. Four (4) copies of Mechanical and Electrical manuals and one (1) copy on CD.
 - 2. Two (2) copies of all other manuals and one (1) copy on CD.

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION

3.01 CLOSEOUT PROCEDURES:

- A. Owner's Training Sessions: Arrange for each installer of equipment that requires regular maintenance to provide DVD-recorded Owner's training sessions. Arrange for each installer of equipment that requires regular maintenance, to meet with the Owner's personnel to review contractor furnished DVD-recorded instruction in the proper operation and maintenance of each component of each system. If installers are not experienced in procedures, provide instruction by manufacturer's representatives. Include a detailed review of the following items:
1. Maintenance manuals
 2. Record documents
 3. Spare parts and materials
 4. Tools
 5. Lubricants
 6. Fuels
 7. Identification systems
 8. Control sequences
 9. Hazards
 10. Cleaning
 11. Warranties, bonds
 12. Maintenance agreements and similar continuing commitments
- B. As part of instruction for operating equipment, demonstrate the following procedures:
1. Start-up
 2. Shut-down
 3. Emergency operations
 4. Noise and vibration adjustments
 5. Safety procedures
 6. Economy and efficiency adjustments
 7. Effective and energy utilization.
- C. Schedule training to conform to personnel availability at the facility and to conclude prior to start up of system. The base duration of training shall be determined by the complexity of the system or equipment and shall be done by qualified instructors from the manufacturer or contractor.
- D. As part of the operator's training, one (1) lesson plan shall be devoted to reviewing of DVD, which shall be incorporated into the training program to allow new employees to view the DVD at their own convenience and be able to comprehend the system without the need for an instructor in attendance.
- E. Prepare one (1) set of DVDs to assist maintenance personnel in trouble-shooting the systems and making routine repairs. All DVD's shall be made at the Project facility to ensure that the video portrayal is representative of the true systems.
- F. In addition to written technical descriptions, the training shall lay out prescribed hands-on-training under the supervision of others who have previously completed the training program. The foregoing techniques are to be developed to produce a program that is self-perpetuating and permits a high level of operator training in the event of high turnover rates among those who are assigned to duties in maintenance.

3.02 FINAL CLEANING:

- A. General: General cleaning during construction is required by the General Conditions and included Section "Temporary Facilities and Controls".
1. Comply with applicable regulatory requirements during the cleaning and disposal

operations. Special cleaning requirements for specific elements of the Work are included in appropriate Sections of Division 3 through 40.

2. Use cleaning materials, which will not create hazards to health or property or cause damage to products or Work. Conduct cleaning and waste disposal operations in compliance with local laws and ordinances. Comply fully with federal and local environmental and anti-pollution regulations.
3. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to a condition acceptable to the Construction Manager. Use cleaning materials and methods recommended by the manufacturer of the products to be cleaned.
4. Schedule operations with sufficient time for surfaces to dry thoroughly to prevent dust, and other contaminants resulting from cleaning operations from adhering to wet or newly finished surfaces.
5. Complete the following cleaning operations before requesting inspection for Certificate of Completion.
 - a. Remove labels that are not permanent labels.
 - b. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compound and other substances that are noticeable as vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
 - c. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, grease, fingerprints, labels, spills, spatters, films and similar foreign substances. Restore reflective surfaces to their original reflective condition. Mop clean concrete floors. Vacuum carpeted surfaces.
 - d. Wipe surfaces of mechanical and electrical equipment, elevator equipment and similar equipment. Remove excess lubrication, paint, mortar droppings and other foreign substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps vacuum inside of electrical panels and cabinetwork.
 - e. Clean the Site, including landscape development areas, of rubbish, litter and other foreign substances. Sweep paved areas broom clean; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface.
 - f. Clean permanent filters and replace disposable filters of units operated during construction.
 - g. Clean ducts, blowers, and coils if units were operated without filters during construction.
 - h. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics and similar spaces.
 - i. Touch up and otherwise repair and restore marred exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored, or show evidence of repair or restoration. Do not paint over "UL" and similar labels including mechanical and electrical nameplates.
6. Pest Control: Engage an experienced exterminator to make a final inspection, and to rid

Project of rodents, insects, and other pests.

7. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.
8. Compliances: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner.
9. Materials remaining after completion of associated Work shall be disposed of or stored as directed by the Construction Manager.

END OF SECTION

SECTION 01 78 36

WARRANTIES AND BONDS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General Conditions and Supplemental General Conditions and other Division 01 General Requirements, apply to this Section.

1.02 SUMMARY:

- A. This Section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturer's standard warranties on products and special warranties. Contractor will review guarantee/warranty and bonds to verify compliance with Contract Documents.
 - 1. Refer to Article GC-31 of the General Conditions and the separate Guaranty of workmanship and materials.
 - 2. General closeout requirements are included in Section 01 77 19 "Project Closeout."
 - 3. Specific requirements for warranties of the Work and products and installations that are specified to be warranted, are included in the individual Sections of Division - 3 through Division -40. If no specific information is included in individual sections of the specifications, warranty period shall be as follows: Manufacturer's warranties notwithstanding, warrant the entire Work against defects in materials and workmanship for twelve (12) months from date of Notice of Completion.
 - 4. Certifications and other commitments and agreements for continuing services to the Owner are specified elsewhere in the Contract Documents.
 - 5. The Contractor will not be responsible for defects due to misuse, negligence, willful damage, improper maintenance, or accident caused by others, nor shall he be responsible for defective parts whose replacement is necessitated by failure of the Owner's maintenance forces to properly clean and service them, provided the Contractor has furnished complete maintenance instructions to the Owner.
- B. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.03 BOND REQUIREMENTS

- A. Each bond specified in this Article (faithful performance bond, payment bond and warranty bond) shall meet the requirements of all applicable statutes, including but not limited to those specified in Public Contract Code section 20129 and Civil Code section 3248.
- B. Each bond specified in this Article shall be issued by a surety company designated as an admitted surety insurer in good standing with and authorized to transact business in this state by the California Department of Insurance, and acceptable to the County of Madera. Bidders are cautioned that

representations made by surety companies will be verified with the California Department of Insurance. Additionally, the County of Madera, in its discretion, when determining the sufficiency of a proposed surety company, may require the surety company to provide additional information supported by documentation. The County of Madera generally requires such information and documentation whenever the proposed surety company has either a Best's Key Rating Guide of less than B+ or a financial size designation of less than VIII. Provided, however, that the County of Madera expressly reserves its right to require all information and documentation to which the County of Madera is legally entitled from any proposed surety company.

- C. Payment and Performance Bonds. The successful bidder shall furnish a faithful performance bond in the amount of 100 percent of the Contract Amount and a payment bond in the amount of 100 percent of the Contract Amount.
- D. Warranty Bond. Prior to Final Payment, Contractor shall post a one (1) year Warranty Bond, issued by the surety company that issued the payment and performance bonds, or if approved by Owner, by another surety company that meets the requirements of this Article and is acceptable to Owner, in the amount of ten percent (10%) of the Final Contract Price.

1.04 DEFINITIONS RE: WARRANTIES:

- A. Standard Product Warranties are pre-printed written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
- B. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.05 WARRANTY REQUIREMENTS:

- A. Related Damages and Losses: When correcting warranty Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranty Work.
- B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- C. Replacement Costs: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
- D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.
 - 1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
- E. The Owner reserves the right to refuse to accept Work for the Project where a special warranty,

certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

1.06 SUBMITTALS RE: WARRANTIES:

- A. Submit written warranties to the and Construction Manager upon request of the or Construction Manager, and in any event prior to any request by Contractor for final acceptance of the Work. The commencement date for warranties applicable to the Work shall be the date of acceptance of the Work as specified in the Notice of Completion, unless otherwise noted in the Contract Documents (e.g., as to manufacturer's warranties for equipment).
 - 1. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Construction Manager within ten (10) days of completion of that designated portion of the Work.
 - 2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
- B. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner through the Construction Manager for approval prior to final execution.
 - 1. Refer to individual Sections of Division - 3 through Division - 40 for specific content requirements, and particular requirements for submittal of special warranties.
 - 2. Submit the Guarantee/Warranty typed on the Contractor's letterhead if for the entire Work, or on the Subcontractor's letterhead if for the Work of a Specification Section.
- C. Form of Submittal: At Final Completion compile two (2) copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.
- D. Bind warranties and bonds into heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2" by 11" paper. Provide separate binders for each building, site and landscape package.
 - 1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name address and telephone number of the installer.
 - 2. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS," the Project title or name, and the name of the Contractor.
 - 3. When operating and maintenance manuals are required for warrantied construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.
- E. Time of Submittal
 - 1. Submit guarantees/warranties within ten (10) days after date of Notice of Completion, prior

to request for Final Payment.

2. For items of Work where acceptance is delayed materially beyond the date of Notice of Completion, furnish updated submittal within ten (10) days after such delayed acceptance, listing the date of delayed acceptance as the start of the guarantee/warranty period.

1.07 REVIEW MEETING:

- A. Eleven (11) months following date of acceptance of the Work, hold a meeting for the purpose of review of, and action upon, guarantees/ warranties, bonds, and service and maintenance contracts, as specified in Section 01 31 19 "PROJECT MEETINGS".

1.08 SERVICE AND MAINTENANCE CONTRACTS

- A. Compile, review, and transmit specified service and maintenance contracts as specified for guarantees/warranties and bonds.

1.09 PREPARATION FOR FINAL INSPECTION

- A. Perform final cleaning as specified hereinbefore.
- B. Assemble guarantees/warranties, service and maintenance contracts, operating and maintenance instructions, and other items as specified, and transmit to the Construction Manager, who will forward them to the Owner after final acceptance of the Work.

1.10 RESTORATION OF DAMAGED WORK

- A. Restore or replace, as specified or determined by the Architect, material and finishes damaged from construction activities at no additional expense to the Owner.
- B. Restoration shall be equal to the original Work, and finishes shall match the appearance of existing adjacent Work.

1.11 REMEDIAL WORK

- A. Remedial Work necessary owing to faulty workmanship or materials shall be at no additional expense to the Owner.
- B. Work shall be coordinated with the Owner and performed at such time and in such manner to cause minimal interruption and inconvenience to the Owner's operations.

1.12 EXTRA MATERIALS

- A. Where required in the individual Specification SECTIONS, furnish extra materials in the quantities and manners specified. Prior to submitting any materials submit a list of all extra material required in the specification sections.
- B. Delivery and certification of such extra materials shall be a prerequisite to Notice of Completion.
- C. Deliver extra materials directly to Owner for sign-off.
- D. Package in clearly identifiable boxes.
- E. Indicate manufacturer's name, part name, and stock number.

- F. Indicate piece of equipment part or tool is for.
- G. Indicate name, address and phone number of closest supplier.

1.13 MISCELLANEOUS RECORD SUBMITTALS

Refer to other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Immediately prior to Final Acceptance, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for use and reference. Submit to the Construction Manager for the County of Madera's records.

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION (not used)

END OF SECTION

GENERAL CONTRACTOR WARRANTY

We the undersigned hereby warrant that the work completed at the MADERA COUNTY RIVERSTONE FIRE STATION in Madera, California, has been performed/supplied in accordance with the Contract Drawings and Specifications, and should any of the materials or equipment prove defective or should the work as a whole prove defective, due to faulty workmanship, material furnished or methods of installation, or should the work or any part thereof fail to operate properly as originally intended and in accordance with the plans and specifications, due to any of the above

causes, all within _____ year(s) after the date on which this contract is accepted by the Owner, the undersigned agrees to reimburse the Owner, upon demand, for its expenses incurred in restoring said work to the condition contemplated in said project, including the cost of any such equipment or materials replaced and the cost of removing and replacing any other work necessary to make such replacement or repairs, or upon demand by the Owner, to replace any such material and to repair said work completely without cost to the Owner so that said work will function successfully as originally contemplated.

The Owner shall have the unqualified option to make any needed replacement or repairs itself or to have such replacements or repairs done by the undersigned. In the event the Owner elects to have said work performed by the undersigned, the undersigned agrees that the repairs shall be made and such materials as are necessary shall be furnished and installed within seven (7) calendar days after the receipt of demand from the Owner. If the undersigned shall fail or refuse to comply with their obligations under this guaranty, the Owner shall be entitled to all costs and expenses reasonably incurred by reason of said failure or refusal.

Signed:

(Signature)

(Print Name)

(Title)

(Date)

(Enter the Contractor Name)

(Address)

(City, State, Zip Code)

(Area Code & Phone Number)

SECTION 01 78 36.2

SUBCONTRACTOR/SUPPLIER WARRANTY

We the undersigned hereby warrant that Specification Section No.

(Enter Specification Section)

titled: _____, which has been installed at
Specification Title / Scope of Work)

Madera County Riverstone Fire Station

(Enter the Name of the Project)

Madera
(Enter City)

County of Madera, California
(Enter County & State)

has been performed/supplied in accordance with the Contract Drawings and Specifications, and should any of the materials or equipment prove defective or should the work as a whole prove defective, due to faulty workmanship, material furnished or methods of installation, or should the work or any part thereof fail to operate properly as originally intended and in accordance with the plans and

specifications, due to any of the above causes, all within _____ year(s) after the date on which this contract is accepted by the Owner, the undersigned agrees to reimburse the Owner, upon demand, for its expenses incurred in restoring said work to the condition contemplated in said project, including the cost of any such equipment or materials replaced and the cost of removing and replacing any other work necessary to make such replacement or repairs, or upon demand by the Owner, to replace any such material and to repair said work completely without cost to the Owner so that said work will function successfully as originally contemplated.

The Owner shall have the unqualified option to make any needed replacement or repairs itself or to have such replacements or repairs done by the undersigned. In the event the Owner elects to have said work performed by the undersigned, the undersigned agrees that the repairs shall be made and such materials as are necessary shall be furnished and installed within seven (7) calendar days after the receipt of demand from the Owner. If the undersigned shall fail or refuse to comply with their obligations under this guaranty, the Owner shall be entitled to all costs and expenses reasonably incurred by reason of said failure or refusal.

Signed:

(Signature)

(Print Name)

(Title)

(Date)

(Enter the Subcontractor / Supplier Name)

(Address)

(City, State, Zip Code)

(Area Code & Phone Number)

END OF DOCUMENT

Section 03 0000
Concrete Work - General

PART 1 GENERAL

1.01 Applicable Section

- A. Submit Shop Drawings, Product Data, Mill Certificates and Samples required by other portions of Contract Documents. The requirements/provisions of the General and Supplementary Conditions and Division 1 Specification Section shall apply to this section.

1.02 Description Of Work

- A. The work included under this section consists of furnishing all material, supplies, equipment, tools, transportation, and facilities, and performing all labor and services necessary for, required in connection with or properly incidental to furnishing, and installing concrete work as described in this section of the specifications, shown on the accompanying drawings, or reasonably implied therefrom, except as hereinafter specifically excluded.
- B. Work Included:
 - 1. All formwork, including any special forms necessary to produce architectural details and/or to accommodate the work of others and removal of forms.
 - 2. All concrete reinforcement, placement, bending and forming thereof.
 - 3. All concrete and cement finishing; all surface treatment and curing, including non-slip finishes and color work.
 - 4. Installation of all reglets, bolts, anchors, cans, sleeves, column anchor bolts, etc., whether furnished under this section or by others (except cans and sleeves required under the Electrical and Mechanical Divisions).
 - 5. The furnishing of all items required to be or shown on the drawings as embedded in concrete, which are not specifically required under other sections.
 - 6. Setting headers and screeds. Curing and protecting concrete.
 - 7. Inserts, sleeves, cans, etc. required under the Plumbing, Mechanical, and Electrical Divisions 22, 23, and 26 respectively.
 - 8. Routing out cracks and sawcutting control joints as required by waterproofing.

PART 2 PRODUCTS - see other portions of specifications.

PART 3 EXECUTION

3.01 Defective Work

- A. General: Work considered to be defective may be ordered by the Architect to be replaced in which case the Contractor shall remove the defective work at his expense. Work considered to be defective shall include, but not be limited to, the following:

Reinforcing:

- 1. Kinks and bends therein which are not scheduled or indicated on the drawings; reinforcing improperly placed, or previously heated, or excessively cold worked reinforcing.

Concrete:

1. Concrete in which defective or inadequate reinforcing steel has been placed.
2. Concrete incorrectly formed or not conforming to details and dimensions on the drawings or with the intent of these documents or concrete the surfaces of which are out of plumb or level.
3. Concrete below specified strength.
4. Concrete not meeting the maximum allowable drying shrinkage requirements.
5. Concrete containing wood, cloth, or other foreign matter, rock pockets, voids, honeycombs, cracks, or cold joints not scheduled or indicated on the drawings.

3.02 Correction Of Defective Work

- A. The Contractor shall, at his expense, make all such corrections and alleviation measures as directed by the Engineer.
- B. Concrete work containing rock pockets, voids, honeycombs, cracks or cold joints not scheduled or indicated on the drawings, shall be chipped out until all unconsolidated material is removed.
- C. Secure approval of chipped-out areas before patching. Patch per ACI 301.

END OF SECTION

**Section 03 05 16
Underslab Vapor Barrier**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sheet vapor barrier under new concrete slabs on grade.

1.02 RELATED REQUIREMENTS

- A. Section 03 10 00 - Concrete Forming and Accessories: Forms and accessories for formwork.
- B. Section 03 20 00 - Concrete Reinforcing.
- C. Section 03 30 00 - Cast-in-Place Concrete: Preparation of subgrade, granular fill, placement of concrete.

1.03 REFERENCE STANDARDS

- A. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting; 2018.
- B. ASTM D1709 - Standard Test Methods for Impact Resistance of Plastic Film by the Free-Falling Dart Method; 2016a, with Editorial Revision (2017).
- C. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs; 2011.
- D. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2017 (Reapproved 2023).

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products.
 - 1. Manufacturer's samples and literature.
 - 2. Manufacturer's installation instructions for placement, seaming, penetration prevention and repair, and perimeter seal per ASTM E1643.
 - 3. Summary of test results per paragraph 9.3 of ASTM E1745.
 - 4. Provide third party documentation that all testing was performed on a single production roll per ASTM E1745 Section 8.1
- C. Test Data: Submit report of tests showing compliance with specified requirements.
- D. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent construction.

1.05 QUALITY ASSURANCE

- A. Pre-Installation Meeting: Installing contractor shall hold a pre-installation meeting with the manufacturer's representative to review manufacturer's installation details.
- B. After the underslab vapor barrier is installed, contractor shall arrange for inspection by manufacturer's representative. Any deviations shall be addressed so that manufacturer's representative can provide letter stating that to the best of their knowledge, based on their observation, installation has been completed per the manufacturer's recommendations.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Underslab Vapor Barrier:
 - 1. Water Vapor Permeance: Not more than 0.010 perms, maximum [grains/(ft²/hr/inHg)] as tested in accordance with mandatory conditioning tests per ASTM E1745 Section 7.1 (7.1.1-7.1.5).
 - 2. Puncture Resistance: Minimum 2,200 grams when tested per ASTM D1709.
 - 3. Tensile Strength: Minimum 70 lbf/in when tested per ASTM D882
 - 4. Complying with ASTM E1745 Class A.
 - 5. Thickness: 15 mils.
 - 6. Manufacturers:
 - a. Stego Industries LLC; Stego Wrap Vapor Barrier (15-mil) Basis of Design: www.stegoindustries.com.
 - b. Perminator 15 mils, polyolefin by W.R. Meadows.
 - c. Moistop Ultra 15 mils, polyolefin by Fortifiber
 - d. VaporBlock 15 mils, polyethylene by Raven Industries.
 - e. X-Treme 15 mils, polyolefin by Tex-Trude
- B. Accessory Products: Vapor barrier manufacturer's recommended tapes, adhesive, mastic, etc., for sealing seams and penetrations in vapor barrier and forming/screeding accessories to prevent undue penetrations of the membrane.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surface over which vapor barrier is to be installed is complete and ready before proceeding with installation of vapor barrier.

3.02 INSTALLATION

- A. Install vapor barrier in accordance with manufacturer's instructions and ASTM E1643.
 - 1. Unroll vapor barrier with the longest dimension parallel with the direction of the concrete placement and face laps away from the expected direction of the placement whenever possible.

2. Extend vapor barrier to the perimeter of the slab. If practicable, terminate it at the top of the slab, otherwise (a) at a point acceptable to the structural engineer or (b) where obstructed by impediments, such as dowels, water stops, or any other site condition requiring early termination of the vapor barrier. At the point of termination, seal vapor barrier to the foundation wall, grade beam or slab itself.
 3. Apply seam tape/textured tape/double-sided tape to a clean and dry vapor barrier.
 4. Seal all penetrations (including pipes) per manufacturer's instructions.
 5. Avoid the use of stakes driven through vapor barrier by utilizing screed and forming systems that will not leave punctures in the vapor barrier.
 6. Repair damaged areas with vapor barrier material of similar (or better) permeance, puncture and tensile.
- B. Lap joints minimum 6 inches and seal with manufacturer's tape.
- C. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions.
- D. No penetration of vapor barrier is allowed except for permanent utilities.
- E. Repair damaged vapor retarder before covering with other materials.
- F. Where installing in existing building tie into existing vapor barrier if possible.

END OF SECTION

Section 03 1000
Concrete Formwork

PART 1 GENERAL

1.01 Applicable Section

- A. The requirements/provisions of the General and Supplementary Conditions and Division 1 Specification Section shall apply to this section.

1.02 Description Of Work

- A. The work included under this section consists of furnishing all material, supplies, equipment, tools, transportation, and facilities, and performing all labor and services necessary for, required in connection with or properly incidental to furnishing, installing, and removing form work as described in this section of the specifications, shown on the accompanying drawings, or reasonably implied therefrom, except as hereinafter specifically excluded.
- B. Work Included:
 - 1. Design of Formwork, Shoring and Falsework
 - 2. Construction and removal of all forms.
 - 3. Installation of items furnished under other sections but indicated therein to be installed under this section.
 - 4. Accuracy of installation is responsibility of section furnishing item.
- C. Related Work Specified Elsewhere:
 - 1. Concrete Reinforcement; Section 03 2000
 - 2. Cast-in-Place concrete; Section 03 3000

1.03 Reference Standards

- A. The following is a list of Reference Standards referred to in this portion of the Specification:
 - 1. W.C.L.I.B.; "Standard Grading and Dressing Rules No. 17"
 - 2. American Concrete Institute Standard ACI 347 "Guide to Formwork for Concrete" and ACI 318 "Building Code Requirements for Reinforced Concrete", Latest edition.
 - 3. California Building Code, current governing edition.
 - 4. American Plywood Association, "U.S. Product Standard PS1-09"

1.04 Quality Assurance

- A. Codes and Standards: Comply with all Federal, State and Local Codes and Safety Regulations. In addition, comply with the provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified.
 - 1. California Building Code, current governing edition.
 - 2. ACI-347 "Guide to Formwork for Concrete", current edition.
 - 3. State of California Department of Transportation Standard Specifications, current governing edition.

- B. Qualifications: Design and detailing of formwork shall be by a person experienced in the design of formwork and familiar with the principles of engineering mechanics. Design and detailing of formwork over 12' in height, shoring, and falsework shall be prepared by a registered Civil/Structural Engineer of the State of California.

1.05 Submittals

- A. General Requirements
 - 1. Submittals shall be made to Architect in accordance with the requirements of Division 1, General Requirements of these specifications.
 - 2. Construction, and fabrication or ordering of materials for formwork shall not begin until Contractor has received submittals reviewed by Architect governing all aspects of the intended work as required in these specifications.
- B. Shop Drawings:
 - 1. Falsework and Shoring Shop Drawings: The Contractor shall submit shop drawings and calculations of any required falsework or shoring. Shop drawings and calculations shall be prepared, stamped, and signed by a registered Civil/Structural Engineer of the State of California. Shop drawings and calculations shall be prepared in accordance with the requirements of the State of California Department of Transportation Standard Specifications, Section 51-1.06A, "Falsework Design and Drawings."

1.06 Sequencing And Scheduling

- A. The Contractor shall obtain information and instructions from other trades and suppliers in ample time to schedule and coordinate the installation of items furnished by them to be embedded in concrete.

PART 2 PRODUCTS

2.01 Forms

- A. Plywood shall be 5/8" Exterior "B.B." Plyform Class I. Each sheet shall be grade stamped with an APA stamp.
- B. Sheathing shall be Douglas Fir "Standard" grade per Grading Rules #17, W.C.L.I.B., Paragraph 118-c. 1x6 shiplap S4S.
- C. Hardboard shall be 1/8" tempered.

2.02 Spreaders

- A. Spreaders shall be of metal type that will give positive tying and accurate spreading.

2.03 Studs, Wales And Shoring

- A. Studs, wales, and shoring shall be Douglas Fir "Construction" grade per Grading Rules #17, W.C.L.I.B. Paragraph 122-b or "No. 2" grade, Paragraph 123-c.

2.04 Manufactured Assemblies

- A. Manufactured assemblies may be used as forms provided that maximum loadings and

deflections used on jacks, brackets, columns, joists and other manufacturer devices does not exceed the manufacturer's recommendations.

PART 3 EXECUTION

3.01 General

- A. Furnish and install all forms, clamps, accessories, etc., required for all poured-in-place concrete below grade and unexposed portions above grade. Where sides of excavations have been cut neat and accurate to size for pouring of concrete directly against the excavation, forms for footings will not be required. Where the face of excavation is more than 3 inches wider than the specified width formwork shall be used.
- B. Furnish and install all forms, clamps, sealer, accessories, etc., required for all poured-in-place concrete above grade that will be exposed.
- C. Provide crack control and keyed cold joint forms.

3.02 Design And Construction Of Formwork

- A. Forms shall be constructed of sound material, of the correct shape and dimension, mortar tight, and of sufficient strength, and so braced and tied together that the movement of equipment, men, materials, or placing and vibrating the concrete will not throw them out of line or position. Construct so that they may be easily removed without damage to the concrete. Any movement or bellying of forms during construction shall be considered just cause for their removal and, in addition, the concrete work so affected. All formed joints on concrete surfaces to be exposed shall be taped and shall align so joints will not be apparent on the concrete surfaces. All dirt, chips, sawdust and other foreign matter shall be completely removed before concrete is placed.
- B. Before concrete is placed in forms, all inside surfaces of the forms shall be thoroughly coated with an approved form sealer. The form sealer shall be of high penetrating quality leaving no film on the surface of the forms that can be absorbed by the concrete.
- C. Form supports shall be placed on adequate foundations and have sufficient strength and bracing to prevent settlement or distortion from the weight of the concrete or other cause. Support shall rest on double wedged shim, or other approved means, so that the forms will be maintained at the proper grade.
- D. Form Ties: Bolts, rods, or other approved devices shall be used for internal form ties and shall be of sufficient quantities to prevent spreading of the forms. The ties shall be placed at least 1 inch away from the finished surface of the concrete. The use of ties consisting of twisted wire loop will not be permitted. Bolts and rods that are to be completely withdrawn shall be coated with grease.
- E. Form Stakes: Where used, form stakes shall be smooth metal, coated as required to allow for removal from hardened concrete. Wood form stakes are not permitted. Fill voids left by form stake removal with non-shrink grout.

3.03 Plumbing, Leveling, Repairing And Maintaining Forms

- A. Before concrete is placed in any form, the horizontal and vertical position of the form shall be carefully verified and all inaccuracies corrected. All wedging and bracing shall be completed in advance of placing of concrete.
- B. Boards or other form materials that have been damaged or checked or warped prior to placing of concrete shall be removed from the forms and replaced with approved

- materials or otherwise corrected to the satisfaction of the engineer.
- C. Assign a sufficient number of men to keep watch on and maintain the forms during placing of concrete. Satisfactorily remedy any displacement or looseness of forms or reinforcement before placing of concrete. No form shall be moved or altered except as may be specifically directed.
- D. Wall forms shall be set to account for movement of post-tensioned slabs that will occur due to long term shortening of slabs. The Engineer will establish the offsets at each level after the Contractor has submitted a detailed pour schedule.

3.04 Field Quality Control

- A. The Contractor shall hire the Engineer responsible for the design of formwork over 12' in height, falsework or shoring to inspect the work as detailed on the reviewed shop drawings.
- B. The Engineer responsible for design of formwork over 12' in height, falsework or shoring shall write a letter to the Architect certifying construction is in accordance with the reviewed shop drawings and meets his/her approval prior to the Contractor placing any concrete.
- C. The Contractor shall verify accuracy of items, furnished under other sections of these specifications and installed under this section.

3.05 Removal Of Formwork, Falsework And Shoring

- A. Formwork, falsework, and shoring shall not be removed until the concrete members have acquired sufficient strength to support their weight and the loads to be superimposed thereon safely.
- B. The contractor is solely responsible for the design, installation, and removal of temporary bracing and construction supports required to complete the project. No portion of the structure shall be considered to be self supporting until the entire vertical and lateral load resisting system is in place.
- C. The Contractor shall request to have field cured compression test specimens taken for any concrete where it is planned to remove formwork, falsework, or shoring sooner than indicated above.
- D. In removing plywood forms, no metal pinch bars shall be used and special care to be taken in stripping. Start at top edge or vertical corner where it is possible to insert wooden wedges. Wedging shall be done gradually and shall be accompanied by light tapping of the plywood panels to crack them loose. Do not remove forms with a single jerk after it has been started at one end.
- E. Forms shall be left in place as long as possible to permit shrinkage away from concrete and plywood forms shall be left in place until all other forms around are stripped and until there is no danger of damaging the architectural concrete due to other work in the vicinity.
- F. Nothing herein shall be construed as relieving the contractor of any responsibility of the safety of the structure.
- G. After stripping, properly protect all concrete to be exposed in the finish work from damage with boards and building paper to prevent staining, spoiled edges, chips, etc.
- H. Whenever the formwork is removed during the curing period, the exposed concrete shall be cured by one of the methods specified in Section 03300.

3.06 Clean Up

- A. Clean up shall be per special conditions. Failure to perform clean up within 24 hours notice by the Architect shall be considered adequate grounds for having the work done by others at the contractor's expense.

END OF SECTION

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Section 03 2000
Reinforcing Steel

PART 1 GENERAL

1.01 Applicable Section

- A. The requirements/provisions of the General and Supplementary Conditions and Division 1 Specification Section shall apply to this section.

1.02 Description Of Work

- A. The work included under this section consists of furnishing all material, supplies, equipment, tools, transportation, and facilities, and performing all labor and services necessary for, required in connection with or properly incidental to furnishing and installing all reinforcing bars, ties, spacing devices, inserts, and all other material required to complete installation, as described in this section of the specifications, shown on the accompanying drawings, or reasonably implied therefrom.
- B. Work Included:
 - 1. Fabricating and installing all reinforcing steel for cast in place concrete and unit masonry.
 - 2. Fabrication and installing all reinforcing steel for shotcrete.
 - 3. Fabrication of reinforcing steel dowels to be embedded in existing concrete and existing masonry.
 - 4. Fabrication and installing all reinforcing steel for tilt-up precast concrete.
- C. Related Work Specified Elsewhere:
 - 1. Concrete Formwork; Section 031000
 - 2. Cast-in-Place Concrete; Section 033000
 - 3. Post Installed Anchors; Section 037010
 - 4. Concrete Unit Masonry; Section 042200

1.03 Reference Standards

- A. The following is a list of Reference Standards referred to in this portion of the specifications:
 - 1. ASTM A184/A184M, Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement.
 - 2. ASTM A615, "Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement".
 - 3. ASTM A706, "Specification for Deformed and Low-Alloy Steel Bars for Concrete Reinforcement".
 - 4. ASTM A970, "Specification for Headed Steel Bars for Concrete Reinforcement".
 - 5. ASTM A1064, "Specification for Carbon Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete".

1.04 Quality Assurance

- A. Codes and Standards: Comply with all applicable Federal, State and Local Code and Safety Regulations. In addition, comply with the provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or

specified:

1. ACI 315R, "Guide to Presenting Reinforcing Steel Design Details", latest edition.
 2. ACI 318, "Building Code Requirements for Structural Concrete", latest edition.
 3. AWS D1.4, "Structural Welding Code- Steel Reinforcing Bars", latest edition.
- B. Mill Certificates: The Contractor shall provide Mill Certificates for reinforcing steel in accordance with the requirements of Part 1.05,, "Submittals" of this specification section. When Mill Certificates cannot be provided, laboratory test reports shall be provided in accordance with the requirements of Part 1.05,, "Submittals" of this specification section.
- C. Sampling, Testing, and Inspection:
1. General
 - a. All materials and work shall be subject to inspection at the mill, the fabrication shop, and at the building site. Material or workmanship not complying fully with the drawings, and/or specifications will be rejected.
 - b. If the Owner's agent, through oversight or otherwise, has accepted material or work which is defective or contrary to specifications, this material or work, regardless of state of completion, may be rejected.
 2. Owner: The Owner shall employ an independent testing laboratory or the Engineer as the Owner's agent to perform the sampling, testing and inspections shown on the contract drawings, and submit certified test results.
 3. Contractor:
 - a. The Contractor shall cooperate with and notify Owner's agent at least 24 hours in advance of inspections required and shall provide samples, test pieces, and facilities for inspection without extra charge.
 - b. The Contractor shall identify each lot of fabricated reinforcing steel to be shipped to the site by assigning an individual lot number that identifies steel by heat number and shall be tagged in such a manner that each such lot can be accurately identified at the job site.
 - c. The Contractor shall remove all unidentified reinforcing steel, anchorage assemblies and bar couplers received at the site.

1.05 Submittals

- A. General Requirements:
1. Submittals shall be made to Architect in accordance with the requirements of Division 1, General Requirements of these specifications.
 2. Construction, fabrication, or ordering of materials shall not begin until Contractor has received submittals reviewed by Architect governing all aspects of the intended work.
- B. Shop Drawings:
1. Shop Drawings shall be submitted that show diagrammatic elevations of all walls, footings, columns, beams, slabs, etc., at a scale sufficiently large to show clearly the positions and erection marks of reinforcing bars, their dowels, and splices.
 2. Use same bar marks on diagrammatic elevations as used on the bar schedule.
 3. Shop drawings shall also show details for congested areas and connections.
 4. Shop Drawings used in field must be reviewed copies.
 5. Contract drawings shall not be reproduced in whole or in part. Contract drawings modified into shop drawings will be returned without review.
 6. Revised submittals shall have clear indications of revised or new information. Clouding is an acceptable form of identification.
- C. Product Data: Manufacturer's catalog sheets including instructions for use and description

of application shall be provided on each of the following items intended for use on project:

1. Mechanical anchorage devices for butt splices.
- D. Mill Certificates:
 1. The Contractor shall provide Mill Certificates for each size of bar for each heat to be used on project.
 2. Mill Certificates shall include name of mill, date of rolling, date of shipping to fabricator and shall be signed by fabricator certifying that each material complies with or exceeds the specified requirements. A Mill Certificate shall be furnished with each lot of material delivered to the project and the lot shall be clearly identified in the Certificate.
 3. When Mill Certificates cannot be provided, the Contractor shall hire a professional testing laboratory to verify compliance and provide laboratory test reports. The Contractor shall pay for the cost of testing.
- E. Laboratory Test Reports:
 1. Laboratory test reports shall show the name of testing agency; date of testing, types of tests performed and shall be signed by a principal of the testing agency who is a registered Civil Engineer in the State of California.
 2. When required by other portions of these specifications, laboratory test reports shall be submitted for each size of bar tested for each heat to show compliance with appropriate ASTM Standards and these specifications.

1.06 Storage Of Materials

- A. Store reinforcement during fabrication and at site to avoid excessive rusting or coating with grease, oil, dirt, or other objectionable materials.

1.07 Sequencing And Scheduling

- A. Coordinate work with all trades so as not to interfere with the work of other trades. Bring interferences between trades to Architect's attention and resolve before any concrete is placed.

PART 2 PRODUCTS

2.01 Reinforcing Bars

- A. Bars for reinforcement listed below shall conform to the requirements of ASTM A706, Grade 60, except as allowed in ACI 318 Section 20.2.2.5.
 1. Chord Bars
 2. Vertical Bars, Columns
 3. Vertical Bars, Pilasters
 4. Vertical and Horizontal Bars in Shear Walls, Coupling Beams, and Footings
 5. All Reinforcing Bars to be Welded or Field Bent
 6. All elements identified in ACI 318 Table 20.2.2.4a
- B. Bars for reinforcement not noted above shall conform to the requirements of ASTM A615, Grade 60.

2.02 Wire

- A. All wire for concrete reinforcement shall conform to "Specifications for Cold-Drawn Steel Wire for Concrete Reinforcement," ASTM A1064.

- B. Holding wire for fusion welding shall conform to ASTM A1064.

2.03 Mesh

- A. All wire fabric mesh shall conform to "Specifications for Wire Fabric for Concrete Reinforcement," ASTM A1064.

2.04 Welding Electrodes

- A. Welding electrodes shall be per Table 5-1 of AWS D1.4.

2.05 Mechanical Coupling Devices

- A. Mechanical coupling devices shall develop 125 percent of the minimum yield strength of the bars spliced.

2.06 Other Materials

- A. All other materials, not specifically described by these specifications but required for complete and proper placement of reinforcement shall be new, first quality of their respective kinds, and subject to the approval of the Architect.

PART 3 EXECUTION

3.01 Existing Conditions

- A. Prior to all work of the section, carefully inspect the installed work of other trades and verify that all work is sufficiently complete to permit the start of work under this section and that the completed work of this section will be in complete accordance with the original design and the reviewed shop drawings. In the event of discrepancy, immediately notify the Architect/Engineer in writing.
- B. In the event conduits, pipes, inserts, sleeves, or any other items interfere with placing the reinforcement as indicated on the drawings or approved shop drawings, or as otherwise required, immediately notify the Architect/Engineer and obtain approval on procedure before placement of reinforcement is started.

3.02 Fabrication

- A. Bends for reinforcing steel shall be made in accordance with ACI 318 latest edition. Bend all bars cold. Do not field bend reinforcing steel in a manner that will injure material, cause the bars to be bent on too tight a radius, or that is not indicated as allowed on drawings or permitted by Engineer. Do not straighten bent or kinked bars for use on project without permission of Engineer. Replace bars with kinks or bends not shown on the drawings.
- B. The use of fusion welding for attaching carrying wires to the foundation rebar work is acceptable with the following provisions:
 - 1. Fusion welding shall be to the stirrups and is not allowed to longitudinal reinforcing steel.
 - 2. Fusion welding of holding wires shall not occur on a bent portion of a reinforcing bar. After holding wire has been fusion welded to a reinforcing bar, that bar may not be bent where the fusion weld occurs.
 - 3. All reinforcing steel to be welded shall comply with ASTM A706.

4. The welding process shall be as outlined in ASTM A1064.
5. The contractor shall submit a complete shop welding program outlining the type of the specific fusion welding machine.
6. Fusion welding shall have periodic special inspection of the in-plant welding, including review of the setup of the machine prior to the start of welding and testing of samples.

3.03 Placing

- A. All reinforcement shall be placed in strict conformity with the requirements of the engineering drawings, both as to location, position and spacing of members. It shall be supported and secured against displacement by the use of adequate and proper wire supporting and spacing devices, tie wires, etc. so that it will remain in its proper position in the finished structure.
- B. Preserve clear space between parallel bars of not less than 1 1/2 times the nominal diameter of round bars and in no case let the clear distance be less than 1 1/2 inches nor less than 1-1/3 times the maximum size of aggregate for concrete. Bars placed in shotcrete shall have a minimum clearance between bars of 2 1/2" for No. 5 and smaller and 6 bar diameters for bars larger than No. 5.
- C. Lap splices shall be contact lap splices in accordance with ACI 318 unless noted otherwise on the Contract Drawings. Bars shall be wired together at laps. Wherever possible, stagger splices in adjacent bars. Make all splices in wire fabric at least 1 1/2 meshes wide or 12", whichever is greater. When splicing in areas to receive shotcrete, lap splices shall be non-contact with at least 2" clearance between bars.
- D. Butt splices shall be accomplished by mechanical anchorage devices.

3.04 Cleaning Reinforcement

- A. Take all means necessary to ensure that steel reinforcement, at the time concrete is placed around it, is completely free from rust, dirt, loose mill scale, oil, paint and all coatings which will destroy or reduce the bond between steel and concrete.

3.05 Field Quality Control

- A. Inspection: The Owner's agent will perform the inspections shown on the contract drawings.

END OF SECTION

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Section 03 3000
Cast-In-Place Concrete

PART 1 GENERAL

1.01 Applicable Section

- A. The requirements/provisions of the General and Supplementary Conditions and Division 1 Specification Section shall apply to this section.

1.02 Description Of Work

- A. The work included under this section consists of furnishing all material, supplies, equipment, tools, transportation, and facilities, and performing all labor and services necessary for, required in connection with or properly incidental to furnishing, and installing cast-in-place concrete work as described in this section of the specifications, shown on the accompanying drawings, or reasonably implied therefrom, except as hereinafter specifically excluded.
- B. Work Included:
 - 1. Design of Concrete Mixes.
 - 2. All concrete and cement finishing; all surface treatment and curing, including non-slip finishes and color work.
 - 3. Installation of all reglets, bolts, anchors, cans, sleeves, column anchor bolts, etc., whether furnished under this section or by others (except cans and sleeves required under the Electrical and Mechanical Divisions).
 - 4. The furnishing of all items required to be or shown on the drawings as embedded in concrete, which are not specifically required under other sections.
 - 5. Setting headers and screeds. Curing and protecting concrete.
 - 6. Grouting of column bases and post-tensioning anchor recesses.
 - 7. Routing out cracks and sawcutting control joints as required by waterproofing.
 - 8. Grouting between bearing plates, channels, etc. and bearing surfaces.
 - 9. Drilling of existing concrete and masonry for placement of bars, dowels, and rods.
 - 10. Grouting of bars, dowels, and rods in existing concrete and existing masonry.
- C. Related Work Specified Elsewhere:
 - 1. Concrete Formwork; Section 03 1000
 - 2. Reinforcing Steel; Section 03 2000
 - 3. Structural Steel and Miscellaneous Iron; Section 05 1200
 - 4. Inserts, sleeves, cans etc. required under Plumbing, Mechanical, and Electrical Divisions 22, 23, and 26 respectively.
 - 5. Underslab vapor barrier; Section 07 1940
 - 6. Post-tensioning concrete; Section 03 3650

1.03 Reference Standards

- A. The following is a list of Reference Standards referred to in this portion of the Specification:
 - 1. ASTM C31 " Standard Practice for Making and Curing Concrete Test Specimens in the Field"

2. ASTM C33 "Standard Specification for Concrete Aggregates"
3. ASTM C39 "Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens"
4. ASTM C42 "Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete"
5. ASTM C94 "Standard Specification for Ready Mixed Concrete"
6. ASTM C143 "Standard Test Method for Slump of Hydraulic-Cement Concrete"
7. ASTM C150 "Standard Specification for Portland Cement"
8. ASTM C157 "Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete"
9. ASTM C171 "Standard Specification for Sheet Materials for Curing Concrete"
10. ASTM C172 "Standard Practice for Sampling Freshly Mixed Concrete"
11. ASTM C173 "Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method"
12. ASTM C231 "Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method"
13. ASTM C260 "Standard Specification for Air-Entraining Admixtures for Concrete"
14. ASTM C309 "Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete"
15. ASTM C330 "Standard Specification for Lightweight Aggregates for Structural Concrete"
16. ASTM C494 "Standard Specification for Chemical Admixtures for Concrete"
17. ASTM C618 "Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete"
18. ASTM C881 "Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete"

1.04 Quality Assurance

- A. Codes and Standards: Comply with all Federal, State and Local Codes and Safety Regulations. In addition, comply with the provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:
1. ASTM C94, "Specifications for Ready Mixed Concrete".
 2. ACI 117, Standard Specifications for Tolerances for Concrete Construction and Materials.
 3. ACI 121R, Quality Management System for Concrete Construction.
 4. ACI 201.2R, Guide to Durable Concrete.
 5. ACI 211.1, Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
 6. ACI 214R, Recommended Practice for Evaluation of Strength Test Results in Concrete.
 7. ACI 301, Specifications for Structural Concrete.
 8. ACI 302.1R, Guide for Concrete Floor and Slab Construction.
 9. ACI 304.2R, Placing Concrete by Pumping Methods.
 10. ACI 304R, Guide for Measuring, Mixing, Transporting, and Placing Concrete.
 11. ACI 305R, Guide to Hot Weather Concreting.
 12. ACI 306.1, Standard Specification for Cold Weather Concreting.
 13. ACI 308R, Guide to Curing Concrete.

14. ACI 309R, Guide for Consolidation of Concrete.
15. ACI 311.4R, Guide for Concrete Inspection.
16. ACI 318, Building Code Requirements for Structural Concrete.
17. ACI SP-15, Field Reference Manual: Standard Specifications for Structural Concrete with Selected ACI and ASTM References.
18. ACI SP-2, ACI Manual of Concrete Inspection.
19. ACI SP-66, ACI Detailing Manual.
20. California Building Code, current edition.
- B. Certificates of Compliance: The Contractor shall provide Certificates of Compliance for concrete materials in accordance with the requirements of Part 1.05, "Submittals", of these specifications. When Certificates of Compliance cannot be provided, laboratory test reports shall be provided in accordance with the requirements of Part 1.05, "Submittal" of these specifications.
- C. Engineer's Review: The Engineer will review the mix designs prepared by the testing laboratory hired by the Contractor.
- D. Sampling, Testing and Inspection:
 1. General:
 - a. All materials and work shall be subject to inspection at the batch plant, and at the building site. Material or workmanship not complying fully with the drawings, and/or specifications will be rejected.
 - b. If the Owner's agent, through oversight or otherwise, has accepted material or work which is defective or contrary to specifications, this material or work, regardless of state of completion, may be rejected.
 2. Owner: The Owner shall employ an independent testing laboratory or the Engineer as the Owner's agent to perform the sampling, testing, and inspections shown on the contract drawings, and submit certified test results.
 3. Contractor:
 - a. The Contractor shall cooperate with and notify Owner's agent at least 24 hours in advance of inspection required and shall provide samples and facilities for inspection without extra charge.
 - b. The Contractor shall hire a professional testing laboratory to provide concrete mix designs for each type of concrete on the job. Each mix design shall be verified by trial batch tests or laboratory test reports and certified to by a principal of the laboratory who is a registered Civil Engineer in the State of California and submitted to the Architect for review. Laboratory test reports, in order to be acceptable, must indicate that not less than 90 percent of at least 20 consecutive 28-day tests exceed the specified strength, and none of said tests are less than 95 percent of specified strength.

1.05 Submittal

- A. General Requirements:
 1. Submittals shall be made to Architect in accordance with the requirements of Division 1, General Requirements of these specifications.
 2. Construction and fabrications or mixing of materials shall not begin until Contractor has received submittals reviewed by Architect governing all aspects of the intended work.
- B. Mix Designs:
 1. Mix designs shall be submitted for each class of concrete on the job and shall

- show names and brands of all materials, proportions, slump, strength, gradation of coarse and fine aggregates, and location to be used on job.
2. Mix designs for concrete designated by compressive strength shall be proportioned on the basis of field experience or trial mixtures, as described in ACI 301.
 3. Drying shrinkage data should be provided in the test histories or trial mixtures for suspended slabs and slabs on grade.
 4. When continuous batch plant inspection is waived, provide current certificate from the National Ready Mixed Concrete Association indicating that the plant has automatic batching and recording capabilities. See section 3.16 below for additional criteria.
- C. Concrete Placement Schedule: The Contractor shall submit a concrete placement schedule which shall show all proposed construction joint locations, limits of each placement sequence, order of placement and type of joint proposed at each joint location.
- D. Product Data: Manufacturer's catalog sheets including instructions for use and description of application shall be provided on each of the following materials:
1. Epoxies
 2. Grout
 3. Admixtures
 4. Curing Compounds
 5. Chemical Hardener
 6. Moisture Barriers
 7. Waterstops
- E. Samples: Submit samples of materials as specified and as otherwise required by Architect, including names, sources and descriptions.
- F. Certificates of Compliance:
1. The Contractor shall provide Certificate of Compliance for each type of aggregate, cement and admixture to be used in each class of concrete or a Certificate of Compliance for each class of concrete.
 2. Certificates of Compliance shall include the name, source, and description of all materials used in each class of concrete and shall be signed by the concrete supplier certifying that each material item complies with, or exceeds the specified requirements. Certificates of Compliance shall be furnished 60 days in advance of any concrete pours.
 3. When Certificates of Compliance cannot be provided, the Contractor shall hire a professional testing laboratory to verify compliance of each type of material to be used in each Class of Concrete. The cost of testing shall be paid for by the Contractor.
- G. Laboratory Test Reports:
1. Laboratory test reports shall show the name of testing agency, date of testing, types of tests performed and shall be signed by a principal of the testing agency who is a registered Civil Engineer in the State of California. Laboratory tests shall not be older than eight (8) months and shall certify that the tested materials meet the specified standards.
 2. Laboratory test reports for concrete mix designs shall clearly identify each material or mix number of each mix tested to verify the correlation between the tested mix designs and the proposed mix designs.
 3. When required by other portions of these specifications, laboratory test reports shall be submitted for each material to be used in each class of concrete, or for each mix design and shall show compliance with appropriate ASTM Standards

and these specifications.

H. Weight and Batch Tags:

1. Weight and batch tags will be supplied to the engineer upon request.

1.06 Sequencing And Scheduling

- A. Obtain information and instructions from other trades and suppliers in ample time to schedule and coordinate the installation of items furnished by them to be embedded in concrete so provision for their work can be made without delaying the project.
- B. Do any cutting and patching made necessary by failure or delay in complying with these requirements, at no cost to Owner.

PART 2 PRODUCTS

2.01 Cementitious Materials

A. Portland Cement

1. Portland cement shall conform to ASTM C150 for type II cement. Use a single, approved standard brand throughout work.

B. Fly Ash

1. Fly ash shall conform to ASTM C618 for class F fly ash.

C. Ground Granulated Blast Furnace Slag

1. Slag shall conform to ASTM C989, Grade 100 or 120.

2.02 Concrete Aggregates

- A. Aggregates for hardrock concrete shall conform to ASTM C33.
- B. Aggregates for light-weight concrete shall conform to ASTM C330.
- C. Fine Aggregate: Use washed natural sand of hard, strong particles and not more than 1% of deleterious materials. Not more than 2.5% shall pass the No. 200 sieve. Fineness modulus - 2.65 to 3.05.
- D. Coarse Aggregate: Use clean, sound-washed gravel or crushed rock. Not more than 1% deleterious material or 5% flat, thin, elongated or laminated material allowed. Cleanliness value shall not be less than 75 when tested in accordance with California Test 227.

2.03 Water

- A. Mixing Water for concrete shall be clean and free from deleterious amounts of acids, alkalis or organic materials.

2.04 Nonshrink Grout

- A. Nonshrink grout shall be pre-mixed, high strength, flowable grout which does not shrink as it cures. Nonshrink grout shall attain a minimum compressive strength of 5000 psi at 7 days. Subject to compliance with requirements provide one of the following:
 1. Metallic
 - a. Embeco 636; BASF.
 - b. Sikagrout 212; Sika Chemical Company.
 - c. Burke Metallic Spec Grout; Dayton Superior Corporation.
 2. Non-Metallic
 - a. Masterflow 928; BASF.

- b. SonogROUT 10K; BASF.
- c. Sure-Grip Grout; Dayton Superior Corporation.

2.05 Curing Products

- A. Liquid membrane curing compounds: Liquid membrane curing compounds shall conform to the requirements of ASTM C309.
- B. Waterproofing Paper: Waterproofing paper for curing concrete shall conform to the requirements of ASTM C171.

2.06 Air-Entraining Admixture

- A. Air-entraining admixtures shall conform to the requirements of ASTM C260. Subject to that compliance, provide one of the following:
 - 1. Sika Aer; Sika Corporation.
 - 2. MB-VR or MB-AE; BASF.
 - 3. Dorex AEA; W.R. Grace.

2.07 Water-Reducing Admixture

- A. Water-reducing admixtures shall conform to the requirements of ASTM C494, Type A, and contain not more than 0.1% chloride ions. Subject to compliance with requirements, provide one of the following:
 - 1. Eucon WR-75; Euclid Chemical Company.
 - 2. MasterPozzoloth 322; BASF.
 - 3. Plastocrete 160; Sika Chemical Corporation.

2.08 High-Range Water-Reducing Admixture (Super Plasticizer)

- A. Super Plasticizer shall conform to the requirements of ASTM C494, Type F or Type G and contain not more than 0.1% chloride ions. Subject to compliance with requirements, provide one of the following:
 - 1. ADVA 190; W.R. Grace.
 - 2. Sikament; Sika Chemical Corporation.
 - 3. Pozzoloth 400; BASF.

2.09 Water-Reducing, Retarding Admixture

- A. Water-reducing, retarding admixtures shall conform to the requirements of ASTM C494, Type D, and contain not more than 0.1% chloride ions. Subject to compliance with requirements, provide one of the following:
 - 1. Pozzoloth 300-R; BASF.
 - 2. Daratard; W.R. Grace.
 - 3. Plastiment; Sika Chemical Corporation.

2.10 Waterstops

- A. General: Provide flat, dumbbell type or centerbulb type waterstops at construction joints and other joints as indicated. Size to suit joints.
- B. Rubber Waterstops: Rubber Waterstops shall conform to the requirements of Corps of Engineers CRD-C513. Subject to compliance with requirements, provide one of the

following:

1. Dayton Superior Corporation
2. Progress Unlimited
3. Williams Products

2.11 Concrete

- A. Concrete Mix Requirements: See plans for concrete mix design requirements and specifications.
- B. Lightweight Concrete Mix Requirements: Lightweight concrete shall have a maximum air dried weight of 115#/ft³, a minimum 28-day compressive strength, minimum cement concrete and maximum water/cement ratio as listed in the contract documents.
- C. Slumps noted on the plans are for concrete without admixtures to be consolidated using vibration. Formwork constraints, congestion of rebar, and pumping of concrete may require increased slump beyond the slump listed on the plans. The contractor shall adjust the slump up to 8" max using admixtures as necessary to provide workability and consistency to permit concrete to be worked readily into forms and around reinforcement under conditions of placement to be employed without segregation or excessive bleeding. All admixtures shall be noted in the submitted mix design and are subject to the Engineer's review. Slump shall not exceed 3" for any concrete placement where top of surface slopes more than 2%.
- D. At Contractor's option, an air entraining agent conforming to the latest revision of ASTM Specification C260 may be added to the concrete to provide entrained air. Air-entraining shall not exceed 3% ± 1.5% without the approval of the engineer.
- E. Drying Shrinkage: The average "Drying Shrinkage" of the concrete after 21 days of drying shall not exceed 0.040 in suspended slabs and 0.048 percent for slabs on grade.

2.12 Control Joints

- A. Control joints shall be sawcut using SOFF-CUT International or equal.

2.13 Underslab Vapor Barrier/Retarder

- A. Vapor barrier/retarder membrane including installation accessories, for installation under concrete slabs-on-grade for floors of interior spaces as follows:
 1. Minimum 15-mil-thick polyolefin geomembrane for superior barrier performance and for tear strength and puncture resistance, manufactured from ISO certified virgin resins.
 2. Acceptable Manufacturers:
 - a. Stego Wrap (15-mil) Vapor Barrier as manufactured by Stego Industries LLC, San Juan Capistrano, CA, 949-493-5460, website: www.stegoindustries.com.
 - b. Ecosheild-E15 (15-mil) Vapor Barrier as manufactured by Epro, Derby, KS.
 - c. Griffolyn Vaporguard as manufactured by Reef Industries, Houston, TX.
 3. Physical Properties:
 - a. Tensile Strength: ASTM E-175, minimum 45.0-lbf/in.
 - b. Water Vapor Barrier: ASTM E-1745, meets or exceeds Class B.

- c. Water transmission Rate: ASTM E-96, 0.006-gr/ft²/hr or lower.
- d. Permeance Rating: ASTM E-96, 0.01-gr/ft²/hr or lower.
- e. Puncture Resistance: ASTM E-1745, minimum 1970 grams.
- 4. Installation Accessories:
 - a. Seam Tape and Vapor Proofing Mastic: Water Vapor Transmission Rate shall be 0.3-perms or lower per ASTM E 96.
 - b. Pipe Boots: Construct pipe boots from vapor barrier material, pressure sensitive tape and/or mastic per manufacturer's instructions.
 - c. Vapor Stakes: Provide Density of 0.0289-lb/in³ per ASTM D 1505: and Specific Gravity of 0.0477 per ASTM D 792.
- B. Vapor barrier/retarder membrane shall be installed in accordance with manufacturer's printed instructions and ASTM E 1643-04. The following shall serve as a general outline for preparation and installation:
 - 1. Preparation: Ensure that subsoil is approved by architect or geotechnical firm. Level and tamp or roll aggregate, sand or tamped earth base as applicable.
 - 2. Schedule preconstruction meeting/conference at the site with field representative of the vapor barrier/retarder membrane prior to installation. Provide minimum one week notice to manufacturer's representative and the Architect.
 - 3. Unroll vapor barrier/retarder with the longest dimension parallel with the direction of the pour. Lap vapor barrier/retarder over footings and seal to foundation walls. Seal to interior/perimeter footings using specified mastic. Overlap joints 6 inches and seal with manufacturer's seam tape.
 - 4. Seal all penetrations (including pipes) per manufacturer's instructions, and as follows:
 - a. Seal single pipe penetrations using pipe boot constructed from the product:
 - 1) Cut a piece of vapor barrier membrane; minimum 12-inches wide and length of 1-1/2 times the circumference of the pipe.
 - 2) Cut slits half the width of the film using scissors.
 - 3) Wrap boot around pipe; tape onto pipe and completely tape the base to the vapor barrier/retarder membrane.
 - 5. Multiple pipe penetrations in close proximity and very small pipes may be sealed using specified vapor proofing mastic.
 - a. Cut out a small area around pipes.
 - b. Cut a patch of vapor barrier/retarder membrane extending at least 6 inches past the cut-out portion in all directions.
 - c. Cut X's or small circles in the patch and install over pipes.
 - d. Overlap at least 6 inches and tape.
 - e. Build up 40-60 mils of mastic, or as needed to completely fill all voids between the pipe and the vapor barrier/retarder membrane.
 - 6. No penetration of the vapor barrier/retarder membrane is allowed except for reinforcing steel and permanent utilities.
 - 7. In the case that forms must be used vapor stakes should be used to hold forms in place:
 - a. Penetrate plastic with stake.
 - b. Treat stake as pipe penetrations(See above, 3.a. - 3.e.).

- c. Leave stakes permanently in concrete.
 - d. Using a power saw, cut the stake off above the seal, but below the surface of the finished concrete.
 - e. The lower portion of the vapor stake remains in place, permanently plugging the penetration.
8. Repair damaged areas by cutting patches of vapor barrier/retarder membrane, overlapping damaged area 6-inches and taping all four sides with tape.

PART 3 EXECUTION

3.01 General Requirements

- A. Produce concrete of required consistency and strength to present appearance satisfactory to Architect.
- B. Use only one brand of cement unless otherwise authorized by Architect.
- C. Embedded Items: Place all pipe sleeves, inserts, anchors bolts, angle frames, ties and other embedded items required for adjoining work or for its support prior to concreting. Embedded items shall be positioned accurately and supported against displacement. Voids in sleeves, inserts and anchor bolt slots shall be filled temporarily with a readily removable material to prevent entry of concrete into the voids.
- D. Store materials delivered to the job and protect from foreign matter and exposure to any elements which would reduce the properties of the material.
- E. When concrete is cast against existing concrete the surface shall be cleaned and roughened by sandblasting, grinding, bush hammering or other suitable means. Wet the surface until it is damp, but without visible free water.

3.02 Existing Concrete Surface Preparation

- A. Where concrete is to be cast against existing concrete, prepare the surface of existing concrete as follows, unless noted otherwise:
 - 1. Chip or scarify surface as required to remove all spalled, severely cracked, deteriorated, loose or unsound material.
 - 2. Chip or scarify any area as required to remove offsets which would cause an abrupt change in thickness of the new concrete. Taper edges to leave no square shoulders at the perimeter of a cavity.
 - 3. Sand-blast or water-blast all surfaces to receive new concrete to remove all dirt, paint, grease, fractured concrete, oil, or other substances that could interfere with the bond of the newly placed concrete. Clean forms and reinforcing of drippings. Clear away debris by compressed air.
 - 4. Wet the surface until it is damp, but without visible free water.
 - 5. Where noted on the drawings to 'intentionally roughen' surface, prepare the surface of existing concrete as follows:
 - 6. Chip or scarify surface as required to remove all spalled, severely cracked, deteriorated, loose or unsound material.
 - 7. Chip or scarify any area as required to remove offsets which would cause an abrupt change in thickness of the new concrete. Taper edges to leave no square shoulders at the perimeter of a cavity.
 - 8. Sand-blast using coarse sand or water-blast to clean and roughen to 1/4" amplitude all surfaces to receive new concrete, exposing coarse aggregate solidly embedded in mortar matrix. Clean forms and reinforcing of drippings. Clear

- away debris by compressed air.
- 9. Wet the surface until it is damp, but without visible free water.

3.03 Mixing

- A. Use ready-mixing concrete complying with ASTM C94 and with the requirements of Contract Documents. Mix for a period of not less than ten (10) minutes; at least three (3) minutes of mixing period shall be immediately prior to discharging at the job.
- B. Introduction of additional water after initial mixing not permitted.

3.04 Weather Requirements

- A. Do not mix or place when atmospheric temperature is below 40 degrees F. or when conditions indicate temperature will fall below 40 degrees within 72 hours. Reinforcement, forms, and ground which concrete will contact shall be completely free of frost. Keep concrete and formwork at a temperature not less than 50 degrees F. for not less than 72 hours after pouring.
- B. When temperature is above 80 degrees F. Contractor shall take precautions to insure that rebar temperature does not exceed ambient temperature.
- C. Temperature of concrete at time of placing shall not be less than 50 degrees F. and not more than 85 degrees F.

3.05 Conveying And Placing

- A. All concrete shall be mixed and delivered in accordance with the requirements of ASTM C94. All concrete shall be placed, finished and cured and all other pertinent construction practices shall be in accordance with the requirements of ACI 301.
- B. It is the contractor's responsibility to provide a concrete mix suitable for the job site conditions. Workability and pumpability may be increased by methods noted in Section 2.11.
- C. Notify Architect at least 48 hours before placing any concrete.
- D. Before placing, clean mixing and conveying equipment, clean forms and space to be occupied by concrete and wet forms. Remove ground water until completion of work.
- E. Place no concrete in any unit of work until all formwork has been completely constructed, all reinforcements secured in place, all items to be built into concrete are in place, and form ties at constructions joints tightened.
- F. Concrete shall be placed so that a uniform appearance of surfaces will be obtained. The concrete will be free of all rock pockets, honeycombs and voids. Deposit as nearly as practical in its final position.
- G. The subgrade must be moist when the concrete is placed for floor slab to prevent excessive loss of water from the concrete mix.
- H. Carry on concreting, once started, as a continuous operation until the section of approved size and shape is completed. Make pour cut-offs of approved detail and location.
- I. Handle concrete as rapidly as practicable from mixer to place of deposit by methods which prevent separation or loss of ingredients. Deposit as nearly as practicable in final position to avoid rehandling or flowing. Do not drop concrete freely where reinforcing bars will cause segregation, nor drop freely more than four feet. Deposit to maintain a plastic surface approximately horizontal. In walls, deposit in horizontal layers not over eighteen inches deep. In pouring columns, walls or thin sections of considerable heights, use openings in forms, elephant trunks, tremies or other approved devices which permit concrete to be placed without segregation or accumulation of hardened concrete on forms

- or metal reinforcement above the level of the concrete. Install so concrete will be dropped vertically.
- J. Concrete that has partially hardened shall not be deposited in the work.
 - K. All concrete floors except sloping to drains shall be brought to a level not exceeding one-eighth inch (1/8") in a 10'-0" measured with a straight edge.
 - L. Vibrating: Employ as many vibrators and tampers as necessary to secure the desired results. Minimum: one per each 20 cubic yards of concrete placed per hour. Eliminate the following practices: Pushing of concrete with vibrator; external vibration of forms; allowing vibrator to vibrate against reinforcing steel where steel projects into green concrete; allowing vibrator to vibrate contact faces of forms. Vibrators shall function at a minimum frequency of 3600 cycles per minute when submerged in concrete. Supplement vibration by forking and spading along the surfaces of the forms and between reinforcing whenever flow is restricted.
 - M. Tremie Concrete: Tremie concrete is a special procedure for placing concrete underwater. Tremie concrete shall be placed by pump or a gravity feed pipe. If a gravity feed pipe is used it shall be 8" minimum diameter and shall be affixed with a shutoff device at the bottom that will allow filling of the pipe with concrete without allowing water to enter. The trunk of the pump or gravity pipe shall be placed at the bottom of caisson prior to placing any concrete. The pump trunk or gravity pipe shall be removed slowly as the caisson is filled insuring that the end of pump trunk or gravity pipe is embedded in concrete a minimum of 1 foot.

3.06 Curing

- A. General: Freshly deposited concrete shall be protected from premature drying and excessively hot or cold temperatures and shall be maintained with minimum moisture loss at a relatively constant temperature for the period of time necessary for the hydration of the cement and proper hardening of the concrete.
- B. Initial Curing:
 - 1. Initial curing shall immediately follow the finishing operation. Concrete shall be kept continuously moist at least overnight. One of the following material or methods shall be used: Ponding or continuous sprinkling; absorptive mat or fabric kept continuously wet.
 - 2. Curing compounds conforming to ASTM C309. Such compounds shall be applied in accordance with the recommendations of the manufacturer and shall not be used on any surface against which additional concrete or other cementitious finishing materials are to be bonded, where epoxy flooring is called for, where concrete topping is to receive waterproofing membrane, nor on surfaces where such curing is prohibited by the project specifications.
- C. Final Curing:
 - 1. Immediately following the initial curing and before the concrete has dried, additional curing shall be accomplished by one of the following materials or methods:
 - a. Continuing the method used in initial curing.
 - b. Waterproofing paper conforming to the requirements of ASTM C171.
 - c. Other moisture-retaining coverings as approved.
- D. Duration of Curing: The final curing shall continue until the cumulative number of days or fractions thereof, not necessarily consecutive, during which temperature of the air in contact with the concrete is above 50 degrees F. has totaled seven days. If high-early-strength concrete has been used, the final curing shall continue for a total of three days.

- Rapid drying at the end of the curing period shall be prevented.
- E. Formed Surfaces: Steel forms heated by the sun and all wood forms in contact with the concrete during the final curing period shall be kept wet. If forms are to be removed during the final curing period, one of the above curing materials or methods shall be employed immediately. Such curing shall be continued for the remainder to the curing period.
- F. Architecturally Exposed Slabs: Architecturally exposed slabs shall be cured by moisture-retaining cover curing. Thoroughly wet the surface of the concrete and then cover with moisture-retaining cover, placed in widest practical width, with edges lapped at least 12 inches and extended 18 inches beyond the area of concrete to be cured, and seal with waterproofing tape. Maintain a film of water under the cover through the curing period by rolling back and rewetting. Immediately repair any holes or tears that occur using cover material and waterproof tape. Start moisture-retaining cover curing as soon as free water has disappeared from concrete surface following finishing. Curing shall be maintained for 7 days.

3.07 Concrete Finishes

- A. Finishes:

<u>Element:</u>	<u>Finish</u>
Exposed foundation surfaces	Rough troweled finish
Permanently exposed formed surfaces	Grout cleaned and sacked
Slabs	Smooth troweled finish

- B. Grout Cleaned Finish: After the concrete still freshly hardened has been pre-dampened, a slurry consisting of one part cement and one and one-half parts sand passing the No. 16 sieve, by damp loose volume, shall be spread over the surface with clean burlap pads or sponge rubber floats. Any surplus shall be removed by scraping and then rubbing with clean burlap. The finish shall be cured in an approved manner. Sample to be approved by Architect.
- C. Troweled Finish: Where a troweled finish is specified, the surface shall be finished first with power floats, then with power trowels, and finally with hand trowels. The first troweling after power floating shall be done by a power trowel and shall produce a smooth surface which is relatively free of defects but which may still contain some trowel marks. Additional trowelings shall be done by hand after the surface has hardened sufficiently. The final troweling shall be done when a ringing sound is produced as the trowel is moved over the surface. The surface shall be free of any trowel marks, uniform in texture and appearance.
- D. Broom or Belt Finish: Slabs shall be given a coarse traverse scored texture by drawing a broom or burlap belt across the surface. Slabs with less than 6% slope shall receive a medium broom finish. Slabs with greater than 6% slope shall receive a heavy broom finish. This operation shall follow immediately after troweling.

3.08 Protection

- A. Protect from injurious action of elements and defacement of any nature during operations.

3.09 Construction Joints

- A. Location and details of construction joints shall be as indicated on drawings, specified, or as approved by the Architect. Locate so as not to impair the strength of the structure. Submit drawings with construction joints clearly defined, and schedule of pouring operations for approval in accordance with Part 1.05 "Submittals" of this specification section, prior to starting concreting.
- B. Sandblast all construction joints using coarse sand or waterblast to clean and roughen entire surface of joint, exposing coarse aggregate solidly embedded in mortar matrix. Clean forms and reinforcing of drippings. Clear away debris by compressed air.

3.10 Control Joints

- A. Provide as indicated on the drawings.

3.11 Patching And Cleaning

- A. After forms are removed, remove projecting fins, bottles, form ties, nails, etc. not necessary for the work or cut back one inch from the surface. Joint marks and fins in exposed work shall be smoothed off and cleaned as directed by the Architect.
- B. Repair defects in concrete work as directed by the Engineer. Chip voids and stone pockets to a depth of one inch or more as required to remove all loose material. Voids, surface irregularities, chipped areas, etc., shall be filled by patching, gunite or rubbing, as directed by the Architect. Repaired surfaces shall duplicate appearance of unpatched work.
- C. Clean exposed concrete surfaces and adjoining work stained by leakage of concrete to approval of Architect.

3.12 Cleanup

- A. In addition to the requirements of Supplementary General Conditions, clean up all concrete and cement work on completion of this portion of the work, except protective coatings or building papers shall remain until floors have completely cured or until interior partitions are to be installed.

3.13 Grouting

- A. Column base plates: The grout shall be mixed and placed in strict accordance with manufacturer's instructions. Care shall be taken in the grouting to ensure that there are no voids or air pockets, and that there is full bearing between the base plates and the grout.
- B. Bearing plates and channels: The space between plates and channels bearing against masonry or concrete shall be filled with grout when required by the Engineer. The grout shall be mixed and placed in strict accordance with manufacturer's instructions. Care shall be taken in the grouting to ensure that there are no voids or air pockets, and that there is full bearing between the bearing plates and channels and the grout.
- C. Post-tensioning Anchor Recesses.

3.14 Defective Work

- A. General: Work considered to be defective may be ordered by the Architect to be replaced in which case the Contractor shall remove the defective work at his expense. Work

considered to be defective shall include, but not be limited to, the following:

1. Concrete in which defective or inadequate reinforcing steel has been placed.
2. Concrete in incorrectly formed, or not conforming to details and dimensions on the drawings or with the intent of these documents, or concrete the surfaces of which are out of plumb or level.
3. Concrete below specified strength.
4. Concrete not meeting the maximum allowable drying shrinkage requirements.
5. Concrete containing wood, cloth, or other foreign matter, rock pockets, voids, honeycombs, cracks or cold joints not scheduled or indicated on the drawings.

3.15 Correction Of Defective Work

- A. The Contractor shall, at his expense, make all such corrections and alleviation measures as directed by the Architect.
- B. Concrete work containing rock pockets, voids, honeycombs, cracks or cold joints not scheduled or indicated on the drawings, shall be chipped out until all unconsolidated material is removed.
- C. Secure approval of chipped-out areas before patching. Patch per ACI 301, or as ordered by the Architect.

3.16 Field Quality Control

- A. Inspections: The Owner's agent will perform inspections shown on the contract drawings.
- B. Engineer Review: The Engineer shall inspect the surfaces between plates and channels, bearing on masonry and concrete to determine if grouting of space is necessary. If grouting of space is necessary, the Owner's agent shall inspect the grouting procedure.
- C. Sampling and Testing: The Owner's agent will perform sampling and testing shown on the contract drawings.
- D. Test Results: Test results shall be reported in writing to Engineer and Contractor within 7 days after tests are made. Test results of less than .6 fc' at 7 days and less than fc' at 28 days shall be reported in writing to the Engineer and Contractor within 48 hours after tests are made. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing services, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests. Strength level of concrete will be considered satisfactory if the averages of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below the specified compressive strength by more than 500 psi. Concrete batch plant weight tags shall be collected at the site and submitted to the Engineer.
When the strength of field-cured cylinders is less than 85% of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing in-place concrete.
- E. Additional Tests: The Owner's agent will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Engineer. Owner's agent may conduct tests

to determine adequacy of concrete by cored cylinders complying with ASTM C42, or by other methods as directed. Contractor shall pay for such tests conducted, other additional testing as may be required, and cost of repairing areas of structure tested when unacceptable concrete is verified.

- F. Continuous Batch Plant Waiver: It is acceptable to waive the continuous batch plant inspection for concrete per CBC Section 1705A.3.3 provided the following requirements are met:
1. The concrete plant shall be fully compliant with the requirements of ASTM C 94, sections 8 & 9 and shall provide a current certificate from the National Ready Mixed Concrete Association indicating that the plant has automatic batching and recording capabilities.
 2. A qualified technician of the testing laboratory shall check the first batch at the start of the day.
 3. A licensed weighmaster shall positively identify materials as to quantity and certify each load by a batch ticket.
 4. Batch tickets, including actual material quantities and weights, shall accompany the load and shall be transmitted to the inspector of record by a truck driver with the load identified thereon. The load shall not be placed without a batch ticket identifying the mix. The inspector shall keep a daily record of placements, identifying each truck, its load, time of receipt, and approximate location of deposit in the structure and shall transmit a copy of the daily record to DSA.

END OF SECTION

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**Section 03 35 11
Concrete Floor Finishes**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface treatments.
- B. Liquid densifiers and hardeners.
- C. Clear coatings.
- D. Clear, penetrating, moisture-vapor-resistant sealers.
- E. Polished concrete.
- F. Sealant at joints

1.02 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete: Finishing of concrete surface to tolerance; floating, troweling, and similar operations; curing.

1.03 REFERENCE STANDARDS

- A. ANSI A326.3 - American National Standard Test Method for Measuring Dynamic Coefficient of Friction of Hard Surface Flooring Materials; 2017.
- B. ASME B46.1 - Surface Texture (Surface Roughness, Waviness, and Lay); 2009.
- C. ASTM F2508 - Standard Practice for Validation, Calibration, and Certification of Walkway Tribometers Using Reference Surfaces; 2016.
- D. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2016 (Reapproved 2021).
- E. ASTM D624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers; 2000 (Reapproved 2020).
- F. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2005 (Reapproved 2010).
- G. CSDA-ST-115 - Measuring Concrete Micro Surface Texture; 2014.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
- B. Coordinate the work with concrete floor placement and concrete floor curing.
- C. Concrete floor finishing sub-contractor to attend pre-installation meeting with concrete placement sub-contractor prior to placement of concrete.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's published data on each finishing product, including information on compatibility of different products and limitations.
- C. Maintenance Data: Provide data on maintenance and renewal of applied finishes.
- D. Provide letter of certification from concrete floor finish manufacturer for polished concrete system stating that the installer is a certified applicator of the polished concrete system and is familiar with proper procedures and installation requirements required by the manufacturer.
- E. Provide copy of tribometer testing and validation reports per ASTM F2508

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least 3 years of documented experience.
- B. Installer Qualifications:
 - 1. Use an experienced installer and adequate number of skilled workmen who are thoroughly trained and experienced in the necessary craft.
 - 2. The special concrete finish manufacturer shall certify applicator.
 - 3. Applicator shall be familiar with the specified requirements and the methods needed for proper performance of work of this section.

1.07 MOCK-UPS

- A. For coatings, construct mock-up area under conditions similar to those that will exist during application, with coatings applied.
- B. Locate where directed.
- C. Mock-up may remain as part of the work.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's sealed packaging, including application instructions.

1.09 FIELD CONDITIONS

- A. Maintain light level equivalent to a minimum 200 W light source at 8 feet above the floor surface over each 20 foot square area of floor being finished.

1.10 PROTECTION

- A. No satisfactory chemical or cleaning procedure is available to remove petroleum stains from the concrete surface. Prevention is therefore essential.
 - 1. All hydraulic powered equipment must be diapered to avoid staining of the concrete.
 - 2. No trade will park vehicles on the inside slab. If necessary to complete their scope of work, drop cloths will be placed under vehicles at all times.
 - 3. No pipe cutting machine will be used on the inside floor slab.
 - 4. Steel will not be placed on interior slab to avoid rust staining.
 - 5. Acids and acidic detergents will not come into contact with slab.
 - 6. All trades are to be informed that the slab must be protected at all times.
- B. Concrete Floor Protection Plan: Concrete floor finish Subcontractor shall assist Contractor in development of Concrete Floor Protection Plan (CFPP). Plan to include
 - 1. Signage to communicate with subcontractors protection requirements. (Available from ASCC as free download)
 - 2. Concrete floor protection materials and placement
 - 3. Plans for maintenance of protection materials
- C. Concrete Floor Protection: Placement, maintenance, removal, and disposal of floor protection as per the CFPP shall be the responsibility of Contractor.

1.11 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Finish Warranty: Provide 20-year manufacturer warranty that treated floor will remain hardened, dustproof and water-repellant.
- C. Finish Warranty: Provide five-year manufacturer warranty against excessive degradation of finish. Include provision for refinishing areas with excessive loss of gloss.

PART 2 PRODUCTS

2.01 APPLICATIONS

- A. Densifier and Hardener:
 - 1. Use at following locations: All locations shown on plans to have exposed concrete floors (not polished).
- B. Polished Finish:
 - 1. Use at following locations: As shown on drawings..

2.02 DENSIFIERS AND HARDENERS

- A. Liquid Densifier and Hardener: Penetrating chemical compound that reacts with concrete, filling the pores, hardening, and dustproofing.
 - 1. Composition: Lithium silicate or modified sodium silicate.
 - 2. Products:
 - a. Ashford Formula; Curecrete Distribution, Inc.: www.ashfordformula.com
 - b. Euclid Chemical Company; ULTRASIL LI+: www.euclidchemical.com/#sle.
 - c. Hi-Tech Systems; ConDense LS: www.hitechpolyurea.com/#sle.
 - d. L&M Construction Chemicals, Inc; LiON HARD: www.lmcc.com/#sle.
 - e. PROSOCO, Inc; Consolideck LS/CS: www.prosoco.com/consolideck/#sle.
 - f. Sinak Corporation; LithoHard: www.sinak.com/#sle.
 - g. W. R. Meadows, Inc; Liqui-Hard Ultra: www.wrmeadows.com/#sle.
 - h. Universal Polishing Systems; Series 35 Diamond Glass Densifier: universalpolishingsystems.com
 - i. Complete Crete Systems; Lithium Nano Densifier: completecretesystems.com
 - j. Hydro-crete; Hydro-Dense Nano: hydro-crete.com

2.03 ACCESSORIES

- A. Concrete Stain or Dye: Translucent, penetrating compound for interior or exterior use.
 - 1. Number of Coats: As recommended by manufacturer and as required to achieve specified color or effect.
 - 2. Composition: Water-based, nonreactive.
 - a. Products:
 - 1) BRICKFORM; BRICKFORM Pro-Dye Plus: www.brickform.com/#sle.
 - 2) Clemons Concrete Coatings; Super Dye: www.clemonsconcretecoatings.com/#sle.
 - 3) Euclid Chemical Company; VIBRA-STAIN SB: www.euclidchemical.com/#sle.
 - 4) Green Umbrella Architectural Concrete Systems; NanoDye: www.greenumbrellasystems.com/#sle.
 - 5) PROSOCO, Inc; GemTone Stain: www.prosoco.com/consolideck/#sle.
 - 6) SureCrete Design Products; Eco-Stain: www.surecretedesign.com/#sle.
- B. Clear Coating: Clear coating recommended by manufacturer for finishing concrete floors and slabs.
 - 1. Gloss: Matte.
 - 2. Products:
 - a. Curecrete; RetroGuard; curecrete.com
 - b. Universal Polishing Systems; 35 Series Diamond Glass Sealer; universalpolishingsystems.com
 - c. Complete Crete Systems; Gloss Guard: completecretesystems.com
 - d. W. R.Meadows; Bellatrix: www.wrmeadows.com/
- C. Joint Filler: Heavy duty self leveling semi-rigid polyurea joint filler as approved by polishing system manufacturer for use with their polishing system.
 - 1. Hardness: Shore "A" of 80 minimum per ASTM D2240
 - 2. Tear Strength: minimum 1 per ASTM D624
 - 3. Tensile Strength: minimum of 1100 psi per ASTM D412

4. Elongation percent, minimum 150 per ASTM D412
5. Color: As selected by architect from full range of available colors
 - a. Products available only in gray unacceptable at polished concrete floors
6. Products:
 - a. Hi-Tech; PE85MI: www.hightechpolyurea.com
 - b. Metzger McGuire; Edge-Pro 80: www.metsgermcguire.com
 - c. Euclid Chemical Company; EUCO Qwikjoint UVR 95; www.euclidchemical.com
 - d. Substitutions: See Section 01 61 00 - Product Requirements.

2.04 POLISHED CONCRETE SYSTEM

- A. Description: Materials, equipment, and procedures designed and furnished by single manufacturer to produce densely polished concrete of specified sheen.
 1. Products:
 - a. Curecrete Distribution, Inc; RetroPlate: www.curecrete.com/#sle.
 - b. PROSOCO, Inc; Consolideck Polished Concrete System: www.prosoco.com/consolideck/#sle.
 - c. W. R. Meadows, Inc; Induroshine and Bellatrix Concrete Enhancer: www.wrmeadows.com/#sle.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that floor surfaces are acceptable to receive the work of this section.
- B. Verify that flaws in concrete have been patched and joints filled with methods and materials suitable for further finishes.

3.02 GENERAL

- A. Apply materials in accordance with manufacturer's instructions.

3.03 COATING APPLICATION

- A. Verify that surface is free of previous coatings, sealers, curing compounds, water repellents, laitance, efflorescence, fats, oils, grease, wax, soluble salts, residues from cleaning agents, and other impediments to adhesion.
- B. Protect adjacent non-coated areas from drips, overflow, and overspray; immediately remove excess material.
- C. Apply coatings in accordance with manufacturer's instructions, matching approved mock-ups for color, special effects, sealing and workmanship.

3.04 CONCRETE POLISHING

- A. Execute using materials, equipment, and procedures specified by manufacturer, using manufacturer approved installer.
- B. In areas with floor drains, maintain design floor elevation at walls; slope surfaces uniformly to drains at 1/8 inch per foot nominal unless noted otherwise.
- C. Final Grind Level: Class B - Fine Aggregate - Salt and Pepper
 - 1. Aggregate Appearance Classes Per ASCC Concrete Polishing Council for reference
 - a. Class A – Cement Fines (Commonly called: Cream Finish) 85-95% fines; 5-15% fine aggregate - No Exposed Aggregate.
 - b. Class B – Fine Aggregate (Commonly called: Salt/Pepper Finish) 85-95% fine aggregate; 5-15 % blend of fines and coarse aggregate - Exposed Sand and small aggregate.
 - c. Class C – Coarse Aggregate 80-90% coarse aggregate; 10-20% cement fines and fine aggregates - 1/4" to 1/2" exposed aggregate.
 - d. Special Aggregate (to be applied to concrete during concrete pour):
- D. Final Polished Sheen: B-1 Semigloss finish; other sheens are included as comparison to illustrate required sheen; final sheen is before addition of any sealer or coating, regardless of whether that is also specified or not.
 - 1. Final polish sheen shall be measured using a texture meter as per CSDA-ST-115 and ASME B46.1

Surface Texture Finish Chart - CSDA-ST-115			
(STG) Surface Texture Grade	Unit of measure = Ra		Surface Grade
	μ in	μ m	
A-1	2	0.0508	High Polish-Very High Gloss
A-2	4	0.1016	High Polish - High Gloss
A-3	8	0.2032	High Polish-Gloss
B-1	16	0.4064	Medium Polish -Semigloss
B-2	32	0.8128	Low Polish - Matte
B-3	64	1.6256	Honed Smooth
C-1	125	3.175	Honed
C-2	250	6.35	Ground
C-3	500	12.7	Heavy Texture

- E. Slip Resistance:
 - 1. Minimum wet dynamic coefficient of friction: 0.42 when measured per ANSI A326.3
 - 2. Minimum floor roughness of 0.41 micrometers (16 micro inches) when measured per ASME B46.1
- F. Protect finished surface as required and as recommended by manufacturer of polishing system.

3.05 PROTECTION

- A. Protect installed coatings from subsequent construction operations.

- B. Do not permit traffic over unprotected floor surface.

END OF SECTION

Section 03 45 00
Precast Architectural Concrete

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Architectural precast concrete Wall Cap and Column Caps.

1.02 RELATED REQUIREMENTS

- A. Section 04 7200 - Cast Stone Masonry
- B. Section 06 1000 - Rough Carpentry

1.03 REFERENCE STANDARDS

- A. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2011.
- B. ASTM C150/C150M - Standard Specification for Portland Cement; 2016.
- C. PCI MNL-117 - Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products; 2007.
- D. PCI MNL-120 - PCI Design Handbook - Precast and Prestressed Concrete; 2010, Seventh Edition.
- E. PCI MNL-122 - Architectural Precast Concrete; 2007, Third Edition.
- F. PCI MNL-123 - Design and Typical Details of Connections for Precast and Prestressed Concrete; 1988, Second Edition.
- G. PCI MNL-135 - Tolerance Manual for Precast and Prestressed Concrete Construction; 2000.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week prior to commencing work of this section.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's information on accessory products, including pigments, admixtures, inserts, plates, etc.

- C. Shop Drawings: Indicate layout, unit locations, configuration, unit identification marks, connection details, support items, dimensions, openings, and relationship to adjacent materials.
- D. Samples: Submit Three Samples, 3 inch in size, illustrating surface finish, color and texture.

1.06 QUALITY ASSURANCE

- A. Fabricator Qualifications:
 - 1. Firm having at least 2 years of documented experience in production of precast concrete of the type required.

1.07 MOCK-UP

- A. Provide one mock-up, 2 feet long by 2 feet wide, with lifting device, and attachment points, and finish in accordance with approved sample.
- B. Locate where directed.
- C. Mock-up may remain as part of the Work.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Architectural Precast Concrete:
 - 1. Concrete Designs Inc.. www.concrete-designs.com (Basis of Design)
 - 2. Substitutions: See Section 01 61 00 - Product Requirements.

2.02 PRECAST UNITS, GENERAL

- A. Precast Architectural Concrete Units: Comply with PCI MNL-120, PCI MNL-122, PCI MNL-123, PCI MNL-135, and ACI 318.
 - 1. Design Loads: Static loads, anticipated dynamic loading, including positive and negative wind loads, thermal movement loads, and erection forces as defined by applicable code.
 - 2. Calculate structural properties of units in accordance with ACI 318.
 - 3. Accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
 - 4. Provide connections that accommodate building movement and thermal movement and adjust to misalignment of structure without unit distortion or damage.

2.03 CONCRETE MATERIALS

- A. Cement: ASTM C150/C150M, Type I - Normal Portland type.

2.04 FABRICATION

- A. Fabricate in compliance with PCI MNL-117 and PCI MNL-135.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that building structure, anchors, devices, and openings are ready to receive work of this section.

3.02 ERECTION

- A. Erect units without damage to shape or finish. Replace or repair damaged panels.
- B. Erect units level and plumb within allowable tolerances.

3.03 CLEANING

- A. Clean all installed units.

3.04 PROTECTION

- A. Protect installed Concrete Units from subsequent construction operations.

END OF SECTION

Section 03 7011
Post Installed Anchors

PART 1 GENERAL

1.01 Applicable sections

- A. The requirements/provisions of the general and supplementary conditions and division 1 specification section shall apply to this section.

1.02 Description of work

- A. The work included under this section consists of furnishing all material, supplies, equipment, tools, transportation, and facilities, and performing all labor and services necessary for, required in connection with or properly incidental to furnishing and installing dowels in existing concrete, and masonry as described in this section of the specifications, shown on the accompanying drawings, or reasonably implied therefrom, except as hereinafter specifically excluded.
- B. Work included:
 - 1. Installation of adhesive anchors in existing concrete and masonry.
 - 2. Installation of expansion anchors in existing concrete and masonry.
 - 3. Installation of threaded anchors in existing concrete and masonry.
- C. Related work specified elsewhere:
 - 1. Reinforcing Steel; Section 03 2000
 - 2. Cast-In-Place Concrete; Section 03 3000
 - 3. Shotcrete; Section 03 3600
 - 4. Concrete Unit Masonry; Section 04 2200

1.03 Quality assurance

- A. Codes and standards: comply with all federal, state and local codes and safety regulations. In addition, comply with the provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:
 - 1. ACI 318, "building code requirements of reinforced concrete", current edition.
 - 2. California building code, current edition.
- B. Testing and inspection: the owner shall employ an independent testing laboratory or the engineer as the owner's agent to perform the inspections and tests, shown on the contract drawings and submit certified test results. The contractor will cooperate with and notify the owner's agent at least 24 hours in advance of inspections required.

1.04 Submittals

- A. General requirements:
 - 1. Submittals shall be made to the architect in accordance with the requirements of division 1, general requirements of these specifications.
 - 2. Construction and fabrication shall not begin until contractor has received submittals reviewed by architect governing all aspects of the intended work.
- B. Product data: manufacturer's catalog sheets including instruction for use and description of application shall be provided on each of the following materials:

1. Adhesive anchors - in addition to manufacturer's catalog sheets the contractor shall provide a written description of where each adhesive material will be used for each different application and an explanation of why the particular material was selected.
2. Threaded anchors - in addition to manufacturer's catalog sheets the contractor shall provide a written description of where each anchor will be used for each different application and an explanation of why the particular material was selected.
3. Threaded anchors - in addition to manufacturer's catalog sheets the contractor shall provide a written description of where each anchor will be used for each different application and an explanation of why the particular material was selected.

PART 2 PRODUCTS

2.01 Adhesive anchoring systems for concrete

- A. Adhesive anchoring systems shall have current ICC or IAPMO reports for shear and tension in cracked concrete per the requirements of the California building code. Adhesive anchors shall be used in strict accordance with manufacturer's recommendations. Subject to compliance with requirements provide one of the following:
 1. HIT-RE 500 v3; Hilti [ICC ESR 3814].
 2. HIT HY 200; Hilti [ICC ESR 3187].
 3. SET-XP; Simpson Strong Tie [ICC ESR 2508].
 4. AT-XP; Simpson Strong Tie [IAPMO UES ER 263].
 5. PURE 110+; Dewalt\powers fasteners [ICC ESR 3298].
 6. AC100+ gold; Dewalt\powers fasteners [ICC ESR 2582].
 7. Approved equal.

2.02 Adhesive anchoring systems for grouted concrete block

- A. Adhesive anchoring systems shall have current ICC or IAPMO reports for shear and tension in grouted concrete block per the requirements of the California building code. Adhesive anchors shall be used in strict accordance with manufacturer's recommendations. Subject to compliance with requirements provide one of the following:
 1. HIT HY 70; Hilti [ICC ESR 2682].
 2. SET-XP; Simpson Strong Tie [IAPMO UES ER 265].
 3. AT-XP; Simpson Strong Tie [IAPMO UES ER 281].
 4. AC100+ Gold, Dewalt\Powers fasteners [ICC ESR 3200]
 5. Approved equal.

2.03 Adhesive anchoring systems for unreinforced masonry

- A. Adhesive anchoring systems shall have current ICC or IAPMO reports for shear and tension in unreinforced masonry per the requirements of the California building code. Adhesive anchors shall be used in strict accordance with manufacturer's recommendations. Subject to compliance with requirements provide one of the following:
 1. HIT HY 70; Hilti [ICC ESR 3342].
 2. Set; Simpson Strong Tie [ICC ESR 1772].
 3. Approved equal.

2.04 Expansion anchoring systems for concrete

- A. Expansion anchoring systems shall have current ICC or IAPMO reports for shear and tension in cracked concrete per the requirements of the California building code. Expansion anchors shall be used in strict accordance with manufacturer's recommendations. Subject to compliance with requirements provide one of the following:
1. Kwik Bolt TZ; Hilti [ICC ESR 1917].
 2. Strong bolt 2 wedge anchors; Simpson Strong Tie [ICC ESR 3037].
 3. Power-stud+ sd2; dewalt\powers fasteners [ICC ESR 2502].
 4. Approved equal.

2.05 Expansion anchoring systems for grouted concrete block

- A. Expansion anchoring systems shall have current ICC or IAPMO reports for shear and tension in grouted concrete block per the requirements of the California building code. Expansion anchors shall be used in strict accordance with manufacturer's recommendations. Subject to compliance with requirements provide one of the following:
1. Kwik Bolt 3; Hilti [ICC ESR 1385].
 2. Wedge All Anchors; Simpson Strong Tie [ICC ESR 1396].
 3. Power-Stud+ SD1; DeWalt\Powers Fasteners [ICC ESR 2966].
 4. Approved equal.

2.06 Adhesive anchoring systems for grouted concrete block

- A. Adhesive anchoring systems shall have current ICC or IAPMO reports for shear and tension in grouted concrete block per the requirements of the California building code. Adhesive anchors shall be used in strict accordance with manufacturer's recommendations. Subject to compliance with requirements provide one of the following:
1. HIT HY 70; Hilti [ICC ESR 2682].
 2. SET-XP; Simpson Strong Tie [IAPMO UES ER 265].
 3. AT-XP; Simpson Strong Tie [IAPMO UES ER 281].
 4. AC100+ GOLD, Dewalt\Powers Fasteners [ICC ESR 3200]
 5. Approved equal.

2.07 Adhesive anchoring systems for unreinforced masonry

- A. Adhesive anchoring systems shall have current ICC or IAPMO reports for shear and tension in unreinforced masonry per the requirements of the California building code. Adhesive anchors shall be used in strict accordance with manufacturer's recommendations. Subject to compliance with requirements provide one of the following:
1. HIT HY 70; Hilti [ICC ER 3342].
 2. SET; Simpson Strong Tie [ICC ER 1772].
 3. Approved equal.

2.08 Expansion anchoring systems for concrete

- A. Expansion anchoring systems shall have current ICC or IAPMO reports for shear and tension in cracked concrete per the requirements of the California building code. Expansion

anchors shall be used in strict accordance with manufacturer's recommendations. Subject to compliance with requirements provide one of the following:

1. KWIK BOLT TZ; Hilti [ICC ESR 1917].
2. STRONG BOLT 2 WEDGE ANCHORS; Simpson Strong Tie [ICC ESR 3037].
3. POWER-STUD+ SD2; Dewalt\Powers Fasteners [ICC ESR 2502].
4. Approved equal.

2.09 Expansion anchoring systems for grouted concrete block

- A. Expansion anchoring systems shall have current ICC or IAPMO reports for shear and tension in grouted concrete block per the requirements of the California building code. Expansion anchors shall be used in strict accordance with manufacturer's recommendations. Subject to compliance with requirements provide one of the following:
1. KWIK BOLT 3; Hilti [ICC ESR 1385].
 2. WEDGE ALL ANCHORS; Simpson Strong Tie [ICC ESR 1396].
 3. POWER-STUD+ SD1; Dewalt\Powers Fasteners [ICC ESR 2966].
 4. Approved equal.

2.10 Threaded anchoring systems for concrete & grouted concrete block

- A. Threaded anchoring systems shall have current ICC or IAPMO reports for shear and tension in cracked concrete and grouted concrete block per the requirements of the California building code. Threaded anchors shall be used in strict accordance with manufacturer's recommendations. Subject to compliance with requirements provide one of the following:
1. KWIK HUS-EZ; Hilti [ICC ESR 3027].
 2. TITEN HD; Simpson Strong Tie [ICC ESR 2713].
 3. TITEN CONCRETE & MASONRY SCREW; Simpson Strong Tie.
 4. SCREWBOLT+; Dewalt\Powers Fasteners [ICC ESR 3889-CONCRETE].
 5. Approved equal.

PART 3 EXECUTION

3.01 Installation

- A. Installation of post installed anchors, including drilling and cleaning of holes, shall be in accordance with the current ICC or IAPMO report and the manufacturer's recommendations.
- B. Holes shall be drilled by methods that will not shatter or damage the concrete adjacent to the holes. Holes drilled through members or into thin elements such as walls or slabs shall utilize rotary drills to avoid impact damage to the opposite side of the member.
- C. Holes in which longitudinal or transverse reinforcement is encountered during drilling before the specified depth is attained shall be rejected. A new hole, which does not strike reinforcement, shall be drilled adjacent to the rejected hole to the depth shown on the plans. Abandoned holes shall be patched with high strength grout or other material approved by the engineer.
- D. The contractor shall use non-destructive methods to locate existing reinforcement prior to drilling where designated on the plans at no additional cost.
- E. Any dowels which fail to bond or are damaged before new concrete is placed shall be removed and replaced at the contractor's expense.

- F. Adhesive anchors shall be installed in concrete having a minimum age of 21 days at the time of anchor installation.
- G. Installation of adhesive anchors that are to be under sustained tension loading in horizontal to vertically overhead orientation shall be done by a certified adhesive installer (AAI) as certified through ACI and in accordance with ACI 318 section D.9.2.2. Proof of current certification shall be submitted to the engineer for approval prior to the commencement of installation.

3.02 Field quality control

- A. Testing and inspections: the owner's agent will perform the inspections shown on the contract drawings for the placement of post installed anchors.
- B. Test results: test results shall be reported in writing to the architect and contractor on a weekly basis, but no later than 5 working days after the end of the week in which the tests were performed.
- C. Additional tests: additional testing required due to failure of post installed anchors to achieve the specified requirements shall be performed by the owner's agent at the contractor's expense.

END OF SECTION

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SECTION 04 2200
CONCRETE UNIT MASONRY

PART 1 GENERAL

1.01 GENERAL

- A. The requirements/provisions of the General and Supplementary Conditions and Division 1 Specification Section shall apply to this section.

1.02 DESCRIPTION OF WORK

- A. Summary: The work included under this section consists of furnishing all materials, supplies, equipments, tools, scaffolding, transportation and facilities and performing all labor and services necessary for or required in connection with or properly incidental to furnishing an installing all masonry construction as described in this section of the specifications, shown on the accompanying drawings, or reasonably implied there from except as hereinafter specifically excluded.
- B. Work Included:
1. All masonry work shown on the drawing.
 2. Masonry staining (as called for on the drawings).
 3. Providing, fabricating and placing reinforcing steel for masonry work.
 4. Placement of anchor bolts, assemblies, and embeds.
 5. Grouting of plates and embeds.
- C. Related Work Specified Elsewhere:
1. Cast-in-Place Concrete; Section 03300
 2. Reinforcing Steel; Section 03200

1.03 REFERENCES

- A. The following is a list of reference standards referred to in this portion of the specification:
1. ASTM C5, "Specification for Quicklime for Structural Purposes"
 2. ASTM C90, "Specification of Hollow Load-Bearing Concrete Masonry Units"
 3. ASTM C144, "Specification for Aggregate for Masonry Mortar"
 4. ASTM C150, "Specification for Portland Cement"
 5. ASTM C207, "Specification for Hydrated Lime for Masonry Purposes"
 6. ASTM C404, "Specification for Aggregates for Masonry Grout"
 7. ASTM C270, "Specification for Mortar for Unit Masonry"
 8. ASTM C476, "Specification for Grout for Masonry"

1.04 QUALITY ASSURANCE

- A. Codes and Standards: Comply with all Federal, State and Local Codes and Safety Regulations. In addition, comply with the provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:
 - 1. California Building Code current governing edition.
 - 2. ACI 530.1-11 "Specification for Masonry Structures"
- B. Certificates of Compliance: The Contractor shall provide Certificates of Compliance for concrete masonry units and grout materials in accordance with the requirements of Part 1.5, "Submittals" of these specifications.
- C. Testing and Inspection:
 - 1. Owner: The Owner shall employ an independent testing laboratory or the engineer as the Owner's agent to perform the inspections and tests shown on the contract drawings, and submit certified test results. The contractor will cooperate with and notify owner's agent at least 48 hours in advance of inspections required.
 - 2. Contractor.
 - a. The Contractor shall hire a professional testing laboratory to provide a grout mix design. The mix design shall be verified by test and certified to by a principal of the laboratory who is a registered Civil Engineer in the State of California and submitted to the Engineer for review.
 - 3. Engineer
 - a. The Engineer shall review grout mix design prepared by testing laboratory.

1.05 SUBMITTALS

- A. General Requirements:
 - 1. Submittals shall be made to Architect in accordance with the requirements of Division 1, General Requirements of these specifications.
 - 2. Construction and fabrications or mixing of materials shall not begin until contractor has received submittals reviewed by Architect/Engineer governing all aspects of the intended work.
- B. Product Data: Manufacturer's catalog sheets including instruction for use and description of applications shall be provided on each of the following materials:
 - 1. Admixtures.
- C. Samples: Submit samples of each different unit masonry type specified for approval.

- D. Certificates of Compliance:
1. The Contractor shall provide Certificates of Compliance for each type of aggregate, cement and admixture to be used in grout. Contractor shall also provide certificates of compliance for each type of concrete unit masonry.
 2. Certificates of Compliance shall be signed by manufacturer and Contractor, certifying that each material item complies with, or exceeds specified requirements. Material certificates shall include laboratory test reports showing compliance for the material proposed for use.
 3. Where Certificates of Compliance cannot be provided, the Contractor shall hire a professional testing laboratory to verify compliance of each type of material proposed for use. The cost of testing shall be paid for by the Contractor.
- E. Laboratory Test Reports: Laboratory test reports shall show the name of testing agency, date of testing and shall be signed by an agent of the testing agency. Laboratory test shall not be older than eight (8) months. Submit laboratory test reports for grout materials, concrete unit masonry and mix designs as specified.
- F. Mix designs: Mix designs shall be submitted for each type of grout and each type of mortar. Mix designs shall show names and brands of all materials, proportions, slump, strength and location to be used on job.
- G. Control joint layout plans: Plans shall be submitted for every floor showing specific control joint locations and details.

1.06 DELIVERY STORAGE AND HANDLING

- A. All masonry units shall be stored on the job site off the ground and protected from rain. Take all means necessary to protect unit masonry before, during, and after installation, and to protect the installed work of other trades.

1.07 SEQUENCING AND SCHEDULING

- A. Obtain information and instructions from other trades and suppliers in ample time to schedule and coordinate the installations of items furnished by them to be embedded in masonry work so provision for their work can be made without delaying the project.
- B. Do any cutting and patching made necessary by failure or delay in complying with these requirements, at no cost to Owner.
- C. Contractor shall provide 48 hours notice to Owner prior to any grout pour to allow Owner sufficient time to notify inspector.

PART 2 PRODUCTS

2.01 PORTLAND CEMENT

- A. Portland Cement shall conform to ASTM C150 for Type II cement. Use a single, approved standard brand throughout work.

2.02 WATER

- A. All water used for mortar and grout shall be clean and free from deleterious amounts of acids, salts, alkali, and organic materials.

2.03 HYDRATED LIME

- A. All hydrated lime shall conform to ASTM C207, Type S.

2.04 QUICKLIME

- A. All quicklime shall conform to ASTM C5.

2.05 LIME PUTTY

- A. All lime putty shall be made from hydrated lime or quicklime. If made from quicklime, other than pulverized (processed) quicklime, the lime shall be properly slaked and then screened through a sieve having not less than 16 meshes per linear inch. After screening, and before using, the slaked lime shall be properly stored and protected for not less than 10 days. If made from pulverized (processed) quicklime, the lime shall be properly slaked for not less than 24 hours or until the lime putty has entirely cooled. All resulting lime putty shall weigh not less than 83 pounds per cubic foot.

2.06 AGGREGATES

- A. Aggregate for mortar shall conform to ASTM C144 except that not less than 3% of the sand shall pass the number 100 sieve.
- B. Aggregate for grout shall conform to ASTM C404, Table 1.

2.07 CONCRETE MASONRY UNITS

- A. All concrete masonry units shall be hollow and suitable for bearing wall construction. All blocks shall be lightweight concrete and shall conform to the requirements of

ASTM C 90. Masonry units shall have cured for not less than 28 days when placed in the structure. Blocks shall be as manufactured by Basalite Concrete Products or approved equal of size and type specified below and as indicated on the drawings. Other miscellaneous sizes may be required for construction but shall match these basis units in color and texture.

- B. Block Types:
1. Exterior exposed block: 8" high x 16" long split-faced, natural gray color open end or double open end units. See Structural drawings for block depth.
 2. Unexposed block: 8" high x 16" long precision block, natural gray color open end or double open end units. See structural drawings for block depth.
 3. Cap block: 2" high x 16" long solid block, natural gray color. Depth to match depth of wall block unless noted otherwise.

2.08 MORTAR MIX

- A. Mortar shall conform to ASTM C270 Type S or M and shall develop a minimum compressive strength of 1900 psi at 28 days.
- B. Mortar color shall be selected by Architect from Tamms Palette or approved equal.

2.09 REINFORCING STEEL

- A. Reinforcing steel shall be provided and fabricated in accordance with the requirements of Section 03200, "Reinforcing Steel" of these specifications.

2.10 GROUT MIX

- A. Grout shall be coarse grout and shall conform to ASTM C476 and shall have a minimum compressive strength of 2500 psi at 28 days. Slump shall be 8" to 10".

2.11 ADMIXTURES

- A. At contractor's option Red Label Suconem, grout aid or approved equal may be added to mortar or grout mix in accordance with manufacturer's instructions.

2.12 SEALER

- A. Sealer for masonry work shall be a clear silicone water repellent as manufactured by:
1. Standard Drywall Products: "Thoroclear 777".
 2. Pro So Co: "Siloxane".
 3. Chemprobe Corp. "Prime-A-Pell 200".
 4. Price Research Ltd: "Price-Seal 5".
 5. Approved Alternate

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

- A. All masonry shall be laid plumb, true to line, with level and accurately spaced courses. Work required to be built in with the masonry, including anchors, shall be built in as the wall construction progresses.
- B. Basic layouts, positions, and elevations shall be as shown on the contract documents. Unit layouts within each panel or wall area shall be made to achieve symmetrical, uniform appearance and to avoid cut units where possible.
- C. Standard width of mortar joints for both horizontal and vertical joints shall be 3/8 inch. Joints on exposed surfaces shall be raked joints. Joints shall be tooled in such a manner as to squeeze the mortar back into the joints, and then raked. No tooling shall be done until after the mortar has taken its initial set. After tooling, the exposed surfaces shall be wiped down with burlap.
- D. Set block units in full mortar beds with full mortar head joints. Cells shall be in vertical continuity. Remove excess mortar from cells as work progresses.
- E. Walls shall have vertical control joints at a spacing approximately 1.5 times the wall height, but no greater than 20 feet on center.
- F. Cutting and patching of masonry required to accommodate the work of others shall be performed by masonry mechanic. Work shall be neatly performed using approved power saws.
- G. Unfinished work shall be stepped back for joining with new work. Before new work 15 started, all loose mortar shall be removed and the exposed joint thoroughly wetted before laying new work.
- H. Perform no work during rain or when outside temperature is 40 degrees F. or lower, or when it appears probable that temperatures below 40 degrees F. will be encountered before the mortar or grout has set.

3.02 MORTAR MIXING

- A. Perform all measurements of materials for mortar accurately using suitable calibrated devices. Shovel measurements will not be acceptable. 94 pounds of Portland

Cements (1 sack) shall be considered as 1 cubic foot.

- B. Use mixers of at least 1 sack capacity. Batches requiring fractional sacks will not be permitted unless the cement is weighted for each such batch.
- C. Place the sand, cements and water in the mixer in that order for each batch of mortar and mix for a period of at least 2 minutes. Add the lime and continue mixing for as long as needed to secure a uniform mass, but in no case less than 10 minutes.
- D. Retempering of mortar by dashing water over the mortar will not be permitted. Retemper mortar only by adding water into a basin made with the mortar and then carefully working the water into the mortar.
- E. Mix the mortar and maintain it on the boards to a slump of 2-3/4 inches plus or minus 1/4 inch using a truncated cone 4 inches by 2 inches, 6 inches high. All mortar which is unused within 1 hour after the initial mixing shall be removed from the work.

3.03 REINFORCING STEEL

- A. Reinforcing steel shall be placed in accordance with the requirements of Section 03200, "Reinforcing Steel" of these Specifications and the requirements of this Specification Section.
- B. Reinforcing steel shall have contact lap splices that are wired tight together. Where dowels are allowed on the structural drawings, reinforcing steel shall be wired tight to dowels.
- C. Vertical bars shall have intermediate support brackets or shall be wired tight to horizontal steel at a spacing to not exceed 192 bar diameters.
- D. Reinforcing steel shall be coordinated with the control joint layout to provide additional reinforcing as shown on the drawings

3.04 WORKMANSHIP

- A. Fill all cells solid with grout. Provide cleanouts in accordance with the California Building Code current governing edition.
- B. Do not place pipes or conduits in any structural masonry, except that rigid electric conduit may be embedded in structural masonry when its location has been detailed on the structural contract drawings.
- C. Do not form chases or recesses not shown on structural contract drawings.
- D. Do not use chipped or cracked blocks. If any such blocks are discovered in a finished

wall, promptly remove them and replace with new blocks to the approval of the Architect and at no additional cost to the Owner.

- E. Verify all types of mortar joints with the Architect before proceeding with block laying. Tool all joints to a dense, smooth surface.

3.05 GROUTING

- A. Concrete masonry walls shall be grouted in 5'-0" max lifts in conformance with the requirements of ACI 530.1. High lift grouting may be used to a height of 12'-8" when approved by the Engineer. Requests for the use of high lift grouting shall be submitted to the Engineer and shall include construction methodology and alternate grout mix designs.

3.06 PROTECTION OF WORK

- A. Protect adjacent construction and previously placed masonry against damage by materials or operations under this Section.
- B. Protect masonry work under construction using heavy moisture-resistant coverings well secured in place when rain or frost is imminent; when day's work is stopped; when lay-up work is subjected to extremely hot winds within 72 hours after placing; or when the work is waiting for grouting.
- C. All masonry walls shall be adequately braced against lateral loads during construction.

3.07 FIELD QUALITY CONTROL

- A. The Owner will employ an independent testing laboratory or the Engineer to perform the tests and inspections shown on the contract drawings and submit certified test reports. The Contractor will cooperate with Owner's agent and notify Owner's agent 48 hours prior to all required testing and inspection.
- B. Test Results: Test reports shall be submitted in writing to Architect/Engineer and Contractor within 7 days after tests are made. Test results not in compliance with requirements of these specifications shall be reported verbally to the Architect/Engineer and Contractor within 24 hours of the tests. Reports of compressive strength test shall contain the project identifications name and number, date of grout or mortar placements, name of testing service, product type and class, location of batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests.
- C. Additional Tests: The testing services will make additional tests of in-place masonry and grout when test results indicate specified strengths and other characteristics have

not been attained in the structure, by methods as directed by the Engineer. Contractor shall pay for such tests conducted, and any other additional testing as may be required, when unacceptable masonry construction is verified.

3.08 WALL CLEANING AND PROTECTION

- A. It shall be the responsibility of the masonry contractor to provide a finish surface acceptable to the Architect. All exterior exposed-to-view masonry surfaces shall be cleaned thoroughly with a bristle brush and water (do not use steel wool) to remove latents, spills, etc.
- B. Solutions or agents for cleaning or other purposes shall not be applied or used on masonry work unless thoroughly tested, and determined by Contractor to have not damaging effect to the masonry or adjacent work.
- C. Remove efflorescence as recommended by masonry unit manufacturer.

3.09 DAMPROOFING

- A. Masonry surfaces shall be sealed with a clear silicone water repellent in accordance with manufacturer's recommendations. See Part 2, "Products," of this specification section for acceptable sealers.
- B. Acceptance condition of surfaces: All surfaces that are to be sealed shall be free of dust, dirt, oil, grease and other foreign material and must be dry to the degree required for satisfactory reception of the sealer. Surfaces shall not be acceptable for sealing if they contain cracks or voids in excess of 1/32 inch in width.
- C. Moisture Content: The optimal acceptable levels of moisture are the following: Inside the substrate-14 percent; surface of substrate-7 percent, when measured by an electronic moisture meter. New concrete or masonry shall have cured for at least 40 days under normal warm-weather conditions prior to any application. Depending on the severity of a preceding rain, at least seven days must elapse before application. If there is any question concerning the amount of moisture in the substrate following a rain, the moisture meter shall be used to verify actual conditions. No material shall be applied if there is any chance of rain during the following 24 hours.
- D. Application: Application shall be by skilled applicators approved by the manufacturer using methods and equipment approved by the manufacturer. A Hudson sprayer may not be used.

END OF SECTION

Section 04 72 00
Cast Stone Masonry

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Architectural cast stone.
- B. Units required are:
 - 1. Exterior wall units, including wall caps, coping, and sills.

1.02 RELATED REQUIREMENTS

- A. Section 04 05 11 - Mortar and Masonry Grout: Mortar for setting cast stone.
- B. Section 04 2000 - Unit Masonry: Installation of cast stone in conjunction with masonry.
- C. Section 06 1000 - Rough Carpentry
- D. Section 07 92 00 - Joint Sealants: Sealing joints indicated to be left open for sealant.
- E. Section 09 2400 - Cement Plastering: Installation of cast stone in conjunction with Cement Plastering.

1.03 REFERENCE STANDARDS

- A. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2011.
- B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.
- C. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2022.
- D. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement; 2009 (Reapproved 2015).
- E. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2018.
- F. ASTM C150/C150M - Standard Specification for Portland Cement; 2016.
- G. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019a, with Editorial Revision.
- H. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2013.

- I. ASTM C1364 - Standard Specification for Architectural Cast Stone; 2010b.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Test results of cast stone components made previously by the manufacturer.
- C. Mortar Color Selection Samples.
- D. Verification Samples: Pieces of actual cast stone components not less than 6 inches square, illustrating range of color and texture to be anticipated in components furnished for the project.
- E. Full-Size Samples, For Review:
 - 1. Basic Shapes: One of each.
 - 2. Accent, Trim and Specialty Shapes: One of each.
- F. Verification Samples: Pieces of actual cast stone components not less than 12 inches square, illustrating range of color and texture to be anticipated in components furnished for the project.
- G. Full-Size Samples: One unit of each shape, for review.
- H. Manufacturer's Qualification Data: Documentation showing compliance with specified requirements.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm with a minimum of 5 years of experience in producing cast stone of the types required for project and:
 - 1. Adequate plant capacity to furnish quality, sizes, and quantity of cast stone required without delaying progress of the work.
 - 2. Products previously produced by plant and exposed to weather that exhibit satisfactory appearance.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver cast stone components secured to shipping pallets and protected from damage and discoloration. Protect corners from damage.
- B. Store cast stone components and installation materials in accordance with manufacturer's instructions.
- C. Store cast stone components on pallets with non-staining, waterproof covers. Ventilate under covers to prevent condensation. Prevent contact with dirt.
- D. Protect cast stone components during handling and installation to prevent chipping, cracking, or other damage.
- E. Store mortar materials where contamination can be avoided.

- F. Schedule and coordinate production and delivery of cast stone components with unit masonry work to optimize on-site inventory and to avoid delaying the work.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Architectural Cast Stone:
 - 1. Eldorado Stone
 - 2. Architect Preapproved Equal.

2.02 ARCHITECTURAL CAST STONE

- A. Cast Stone: Architectural concrete product manufactured to simulate appearance of natural stone, complying with ASTM C1364.
 - 1. Compressive Strength: As specified in ASTM C1364; calculate strength of pieces to be field cut at 80 percent of uncut piece.
 - 2. Freeze-Thaw Resistance: Demonstrated by laboratory testing in accordance with ASTM C1364.
 - 3. Surface Texture: Fine grained texture, with no bugholes, air voids, or other surface blemishes visible from distance of 20 feet.
 - 4. Type: As shown on plans
 - 5. Color: As shown on plans.
 - 6. Manufacturer: Eldorado Stone
 - a. Size: Sizes and Shapes: Random sizes, shapes and textures to duplicate natural stone. Stone module sizes: 1 inches to 4 inches height; 4 inches to 16 inches length and 1-1/4 inches to 2 inches thick.
 - b. Remove cement film from exposed surfaces before packaging for shipment.
 - c. Compressive Strength: ASTM C 192 and ASTM C39, 1800 psi (12.4 MPa), 5 specimen average, 1500 psi (10.3 MPa) minimum for individual unit.
 - d. Bond Between Stone Unit, Type S Mortar, and Backing: ASTM C 482, 50 psi (345 kPa).
 - e. Thermal Resistance: ASTM C 177, R-factor, 0.355 per inch (25.4 mm) of thickness.
 - f. Freeze/Thaw: ASTM C 67, no disintegration and less than 3 percent weight loss.
 - g. Fire Hazard Test, UL 723:
 - 1) Flame spread: 0.
 - 2) Smoke Development: 0.
 - h. Maximum Veneer Unit Weight: 15 psf (73 kg/m²).
 - 7. Architectural Trim: Architectural Trim Stone by Eldorado Stone Products - all items attached to wall require architectural trim.
 - a. Cast Stone watertable at cast stone masonry wainscot.
 - 1) Color: To match adjacent veneer
 - 2) Size: To extent 1 1/2" beyond face of wainscot and slope away from building.
 - b. Light Fixture Box Stones-Chamfered Edge with Grooved Border:
 - 1) Color: To match adjacent veneer
 - 2) Size: 9 inches by 15 inches, 8 inches by 10-1/4 inches, or as shown on Drawings.

- 3) Provide 4 inches by 1-1/2 inches (115 mm) UL approved metal octagon extension box.
 - c. Hose Bib Stone-Chamfered Edge by Eldorado Stone Products
 - 1) Color: to match adjacent veneer.
 - 2) Size: 4 inches by 4 inches.
 - 3) Opening size: 1-1/2 inch diameter.
 - d. Electrical Box Stones-Raised Chamfered Edge:
 - 1) Color: to match adjacent veneer.
 - 2) Size: 6-1/4 inches by 8 by 1-1/2 inches.
 - 3) Provide single receptacle 2 inches by 4 inches by 1-1/2 inches UL approved metal extension box.
 - e. Provide 2" thick flat precast concrete panel at large items such as dedication plaque at stone finish
- B. Shapes: Provide shapes indicated on drawings.
 - 1. Variation from Any Dimension, Including Bow, Camber, and Twist: Maximum of plus/minus 1/8 inch or length divided by 360, whichever is greater, but not more than 1/4 inch.
 - 2. Unless otherwise indicated on drawings, provide:
 - a. Wash or slope of 1:12 on exterior horizontal surfaces.
 - b. Drips on projecting components, wherever possible.
 - c. Raised fillets at back of sills and at ends to be built in.
- C. Reinforcement: Provide reinforcement as required to withstand handling and structural stresses; comply with ACI 318.

2.03 MATERIALS

- A. Portland Cement: ASTM C150/C150M.
 - 1. For Mortar: Type I or II, except Type III may be used in cold weather.
- B. Coarse Aggregate: ASTM C33/C33M, except for gradation; granite, quartz, or limestone.
- C. Fine Aggregate: ASTM C33/C33M, except for gradation; natural or manufactured sands.
- D. Admixtures: ASTM C494/C494M.
- E. Water: Potable.
- F. Weather Resistant Barrier: to match cement plaster system. Kraft waterproof building paper UBC Standard No 14-1 at a minimum.
- G. Metal Lath: 3.4 lb (1.8 kg/m²) galvanized expanded rib lath.
- H. Fasteners: Into Wood Studs: Minimum 0.120 inch (3 mm) shank diameter galvanized nails or staples of sufficient length to penetrate 1-3/8 inches (35 mm) minimum into the stud.
- I. Reinforcing Bars: ASTM A615/A615M, Grade 40 (40,000 psi), deformed bars, galvanized.
 - 1. Galvanized in accordance with ASTM A767/A767M, Class I.

- J. Embedded Anchors, Dowels, and Inserts: Type 304 stainless steel, of type and size as required for conditions.
- K. Shelf Angles and Similar Structural Items: Hot-dip galvanized steel per ASTM A123/A123M, of shapes and sizes as required for conditions.
- L. Mortar: Portland cement-lime, ASTM C270 Type N ; do not use masonry cement.
- M. Cleaner: General-purpose cleaner designed for removing mortar and grout stains, efflorescence, and other construction stains from new masonry surfaces without discoloring or damaging masonry surfaces; approved for intended use by cast stone manufacturer and by cleaner manufacturer for use on cast stone and adjacent masonry materials.
- N. Sealer: Apply sealer at all cast stone. Sealer to be provided by stone manufacturer that provides cast stone.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine construction to receive cast stone components. Notify Architect if construction is not acceptable.
- B. Do not begin installation until unacceptable conditions have been corrected.
- C. Protect surrounding work from damage by work in this section.
- D. Verify that all receptacles and miscellaneous items (moldings, hose bibs, etc.) are acceptable

3.02 INSTALLATION

- A. Mechanically anchor each cast stone unit.
- B. Setting:
 - 1. Drench cast stone components with clear, running water immediately before installation.
 - 2. Set units in a full bed of mortar unless otherwise indicated.
 - 3. Fill vertical joints with mortar.
- C. Joints: Install joints per manufacturers installation instructions.
 - 1. NO VERTICAL STONES.
 - 2. Horizontal Joints: no longer than 4 feet to 6 feet depending on stone.
 - 3. Vertical Joints: no higher than 6 inches higher than largest stone.

3.03 CLEANING

- A. Repair chips and other surface damage noticeable when viewed in direct daylight at 10 feet.
 - 1. Repair with matching touchup material provided by the manufacturer and in accordance with manufacturer's instructions.
 - 2. Repair methods and results subject to Architect 's approval.

- B. Keep cast stone components clean as work progresses.
 - 1. Remove excess mortar and smears using a wire brush or steel wool within 1 to 2 hours of installation.
 - 2. NO ACID CLEANERS.
 - 3. Leave surfaces thoroughly clean and free of mortar and other soiling.

3.04 PROTECTION

- A. Protect completed work from damage.
- B. Clean, repair, or restore damaged or mortar-splashed work to condition of new work.

End of Section

Section 05 1200
Structural Steel And Miscellaneous Iron

PART 1 GENERAL

1.01 Applicable Section

- A. The requirements/provisions of the General and Supplementary Conditions and Division 1 Specification Section shall apply to this section.

1.02 Description Of Work

- A. The work included under this section consists of furnishing all material, supplies, equipment, tools, transportation, and facilities, and performing all labor and services necessary for, required in connection with or properly incidental to furnishing, fabricating, priming, and erecting structural steel and miscellaneous iron complete in place, as described in this section of the specifications, shown on the accompanying drawings, or reasonably implied therefrom, except as hereinafter specifically excluded.
- B. Work Included:
 - 1. All structural steel indicated on the drawings.
 - 2. Furnishing all column anchor bolts and base assemblies with nuts and washers.
 - 3. Supervision of the placement of anchor bolt assemblies
- C. Related Work Specified Elsewhere:
 - 1. Cast-in-place Concrete; Section 03 3000
 - 2. Grouting of Column Bases; Section 03 3000
 - 3. Placement of Anchor Bolts, Assemblies, and Embeds; Section 03 3000, and Section 04 2200

1.03 Reference Standards

- A. The following is a list of reference standards referred to in this portion of the specification:
 - 1. ASTM A36, "Specification for Carbon Structural Steel"
 - 2. ASTM A53, "Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless"
 - 3. ASTM A307, "Specification for Carbon Steel Bolts and Studs"
 - 4. ASTM A500, "Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes"
 - 5. ASTM A572, "Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel"
 - 6. ASTM A992, "Specification for Steel for Structural Shapes for use in Building Framing"
 - 7. ASTM F1554 "Specification for Anchor Bolts, Steel"
 - 8. ASTM F3125 "Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated"
 - 9. SSPC, "Systems and Specifications, Steel Structures Painting Manual Volume 2" by Steel Structures Painting Council.

1.04 Quality Assurance

- A. Codes and Standards: Comply with all Federal, State, and Local codes and safety regulations. In addition, the fabrication, priming, and erection of structural steel shall comply with all the applicable provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:
 - 1. "Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings" by the American Institute of Steel Construction, current edition.
 - 2. "Codes of Standard Practice for Steel Buildings and Bridges" by said AISC, current edition.
 - 3. A.W.S. "Structural Welding Code – Steel," D1.1, current edition.
 - 4. A.W.S. "Structural Welding Code – Seismic Supplement," D1.8, current edition.
 - 5. "Specifications for Structural Joints using ASTM A325 or A490 bolts," current edition as approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation, and endorsed by the AISC.
- B. Qualifications: Welding processes and welding operators shall be qualified in accordance with AWS "Standard Qualification Procedure". Welders to be employed are to provide AWS certification for the type of welding necessary.
- C. Mill Certificates: The Contractor shall provide Mill Certificates for structural steel and miscellaneous iron in accordance with the requirements of Part 1.05, "Submittals", of this specification section. When Mill Certificates cannot be provided, laboratory test reports shall be provided in accordance with the requirements of Part 1.05, "Submittals", of this specification section.
- D. Sampling, Testing, and Inspection:
 - 1. General:
 - a. All materials and work shall be subject to inspection at the mill, the fabricating shop, and at the building site. Material or workmanship not complying fully with the drawings, and/or specifications will be rejected.
 - b. If the inspector, through oversight or otherwise, has accepted material or work which is defective or contrary to specifications, this material or work, regardless of state of completion, may be rejected.
 - 2. Owner: The Owner shall employ an independent testing agency or the Engineer as the Owner's agent to perform sampling, testing, and inspections as shown on the contact drawings and submit certified test results.
 - 3. Contractor:
 - a. The Contractor shall cooperate with and notify Owner's agent at least 24 hours in advance of inspections required and shall supply samples, test pieces, and facilities for inspection without extra charge.
 - b. The Contractor shall identify and tag each lot of fabricated steel to be shipped to the site by heat numbers in such a manner that it can be accurately identified at the job site.
 - c. The Contractor shall remove all unidentified steel received at the site.

1.05 Submittals

- A. General Requirements
 - 1. Submittals shall be made to Architect in accordance with the requirements of Division 1, General Requirements of these specifications.
 - 2. Construction, and fabrication or ordering of materials shall not begin until Contractor has received submittals reviewed by Architect governing all aspects

- of the intended work.
- B. Shop Drawings:
1. Shop drawings for steel fabrications shall be submitted for review.
 2. Submittals shall include anchor bolt setting plans, erection drawings and fabrication drawings. Information shown on the shop drawings shall include, but not be limited to, the following:
 - a. Anchor bolt setting plans shall show layout, anchor bolts sizes and grades, embedment, and template construction.
 - b. Erection Drawings shall show layout, marking and position of each member, and field connections.
 - c. Fabrication Drawings shall show details of members, including sizes, grades, connections, spacing of bolts and welds, designation of Architecturally Exposed Structural Steel, and the limits of paint applications.
 3. Partial submittals shall be clearly identified by the contractor.
 4. The omissions from the shop and installation drawings of any materials shown on the Specifications shall not relieve the contractor of the responsibility of furnishing and installing such materials, even though such drawings may have been returned and reviewed.
 5. Shop drawings and calculations for temporary shoring and bracing shall be submitted for review. The shop drawings shall show layout, size of members and connection details. Calculations shall show all stresses in members and connections, from dead, live, and lateral loads in accordance with the requirements of the C.B.C. current governing edition. Shop drawings and calculations for temporary shoring and bracing shall be stamped and signed by a civil engineer registered in the State of California.
 6. Contract drawings shall not be reproduced in whole or in part. Contract drawings modified into shop drawings will be returned without review.
 7. Revised submittals shall have clear indications of revised or new information. Clouding is an acceptable form of identification.
- C. Mill Certificates:
1. The Contractor shall provide Mill Certificates for each grade of steel for each heat to be used on project.
 2. Mill Certificates shall meet the requirements of AISC 360 and all applicable ASTM standards.
 3. Mill Certificates shall be furnished with each lot of material shipped to the site and shall be signed by the Contractor which will serve to certify that all structural steel materials installed comply with specified requirements.
 4. When Mill Certificates cannot be provided, the Contractor shall hire a professional testing laboratory to verify compliance of each type of material to be used and provide laboratory test reports. The cost of testing shall be paid for by the Contractor.
- D. Laboratory Test Reports:
1. Laboratory test reports shall show the name of testing agency, date of testing, types of tests performed and shall be signed by a principal of the testing agency who is a registered civil engineer in the State of California.
 2. When required by other portions of these specifications, laboratory test reports shall be submitted for each type of steel for each heat to show compliance with appropriate ASTM Standards and these specifications.

- E. Welding Procedure Specifications:
 - 1. Welding procedure specifications for all prequalified joints shall be submitted per AWS D1.1, 5.1.2 to the Engineer and reviewed prior to beginning fabrication. Non prequalified joints shall be qualified per AWS requirements.

1.06 Definitions

- A. Architecturally exposed structural steel: structural steel designated as "architecturally exposed structural steel" or "AESS" in the contract documents.
 - 1. Provide "AESS" as follows: exposed structural steel that is within 16 feet vertically and 10 feet horizontally of a walking surface and is visible to a person standing on that walking surface.

PART 2 PRODUCTS

2.01 Material

- A. Structural Steel Wide Flange and Tee Shapes: Shall be new and shall conform to the requirements of ASTM A992.
- B. Structural Steel Channels and Angles: Shall be new and shall conform to the requirements of ASTM A36.
- C. Structural Steel Plate: Shall be new and shall conform to the requirements of ASTM A572.
- D. Structural Steel Tubes: Shall be new and shall conform to the requirements of ASTM A500, Grade B.
- E. Steel Pipe: ASTM A53, Types E or S, Grade B, with sulphur not exceeding .05%.
- F. Arc-welding Electrodes: Arc-welding electrodes shall be E70 series electrodes for A36, A572 and A992 material, E80 Series for A706 reinforcing steel and E90 series for A615 reinforcing steel. Electrodes shall be as recommended by their manufacturers for the positions and conditions of actual use. All welds used in members and connections in the seismic Force Resisting System shall be made with filler metals meeting the requirements specified in AWS D1.8 clause 6.3.
- G. High Strength Bolts: High strength bolts (HSB) shall conform to ASTM F3125 Grade A325.
- H. Machine Bolts: Machine bolts (MB) and sag rods shall conform to ASTM A307, manufactured to American Standard Bolt and Nut dimensions with "Free Fit - Class 2" threads. All unfinished bolts shall have an approved lock washer under nut.
- I. Prime Coat: Prime coat for interior members shall meet the requirements of SSPC-Paint 25 or acceptable equal. Prime coat for exterior members shall meet the requirements of SSPC-Paint 20 or acceptable equal.
- J. Smooth Rods: Smooth Rods shall conform to ASTM A36.
- K. Anchor Bolts: Anchor bolts shall conform to ASTM F1554 grade 36.
- L. Headed Studs, Deformed Bar Anchors, and Threaded Studs: Headed Studs shall be H4L or S3L; Deformed Bar Anchors shall be D2L and Threaded Studs shall be CPL as manufactured by TRW Nelson Stud or equal.
- M. High Strength Rods: High strength rods shall conform to ASTM F1554 grade 55, unless noted otherwise.
- N. Nuts shall be as shown below and finish shall match fastener.

	<u>Fastener Grade & Size</u>	<u>Nut Class</u>	<u>Nut Style</u>
Bolts:			
ASTM F3125 Gr A325	Type 1, Uncoated	ASTM A563-C,C3,D,DH, DH3	Heavy Hex
	Type 1, Zinc Coated	ASTM A563-DH	Heavy Hex
	Type 3, Uncoated	ASTM A563-C3,DH3	Heavy Hex
ASTM F3125 Gr A490	Type 1, Uncoated	ASTM A563-DH,DH3	Heavy Hex
	Type 3, Uncoated	ASTM A563-DH3	Heavy Hex
Rods:			
ASTM A1554	¼" to 1½" Uncoated	ASTM A563-A	Heavy Hex
	Over 1½" to 3" Uncoated	ASTM A563-DH	Heavy Hex
	¼" to 3" Zinc Coated	ASTM A563-DH	Heavy Hex

- O. Washers shall be flat circular, rectangular or square beveled washers and shall conform to ASTM F436 Type 1. Finish shall match nut. Washers shall be installed under the element being turned for A325 bolts and under both the head and the nut for A490 bolts.

2.02 Fabrication

- A. Welding: Welding shall be by operators who are qualified by test as per AWS "Standard Qualification Procedure" to perform type of work required.
- B. High Strength Bolting: All high strength bolted connections shall be bearing type connections unless otherwise noted on the plans. Where noted on the plans, high strength bolted connections shall be slip critical type connections.
- C. Bolts, rods, washers and nuts exposed to weather shall be hot dipped galvanized steel in compliance with ASTM A153.
- D. Straightness (camber and sweep) Tolerance:
 1. Unless otherwise noted, straightness tolerances shall be per ASTM A6.
 2. Sweep tolerance for channels and angles: Maintain a maximum variation of 1/8" times the number of feet of total length divided by 5, unless alternate criteria is approved by the Engineer.
- E. Painting:
 1. Priming: Painting under this section is limited to priming.
 - a. The prime coat shall be applied in the shop and touched up after erection. Anchor bolts and column assemblies 2 inches and more below finish floor shall be left unpainted. High strength bolted connections shall be left unpainted within 3" of connection.
 - b. Paint shall be delivered to shop in original sealed containers marked with manufacturer's name and brand identification.
 - c. Use paint as prepared by the manufacturer without thinning or other

admixture unless so stated by the manufacturer. Execute painting on a dry clean surface, free from rust, loose scale or grease. Do not do any painting in temperatures lower than 45 degrees F.

PART 3 EXECUTION

3.01 Workmanship

- A. The workmanship shall be in accordance with AISC Standard Specifications, and shall be of the highest quality found in contemporary structural work.
- B. All exposed gaps or bolt holes as a result of slotted gusset plates or erection bolts shall be filled and ground smooth. Erection bolts shall be removed after welding. Exposed ends of pipes and hollow sections shall be sealed with a cap plate and ground smooth unless noted otherwise on the architectural drawings.
- C. For Architecturally Exposed Structural Steel (AESS) shop fabricate and assemble AESS to the maximum extent possible. Locate field joints at concealed locations if possible. Detail assemblies to minimize handling and to expedite erection. Handle and fabricate AESS with special care including the following:
 - 1. Fabricate with exposed surfaces smooth, square, and free of surface blemishes including pitting, rust, scale, and roughness.
 - 2. Grind sheared, punched, and flame-cut edges of AESS to remove burrs and provide smooth surfaces and edges.
 - 3. Fabricate AESS with exposed surfaces free of mill marks, including rolled trade names and stamped or raised identification.
 - 4. Fabricate AESS with exposed surfaces free of seams to maximum extent possible.
 - 5. Remove blemishes by filling or grinding or by welding and grinding, before cleaning, treating, and shop priming.
 - 6. Fabricate with piece marks fully hidden in the completed structure or made with media that permits full removal after erection.
 - 7. Fabricate AESS to the tolerances specified in AISC 303 Section 10.2 for steel that is designated AESS.
 - 8. Seal-weld open ends of hollow structural sections with 5/16-inch closure plates for AESS.
 - 9. Ease exposed edges to a radius of approximately 1/32 inch radius, unless otherwise shown on the drawings. Miter exposed corner joints and machine fit to a hairline joint.
 - 10. Coping and Blocking Tolerance: Maintain a uniform gap of 1/8" +/- 1/32" at all copes and blocks.
 - 11. Joint gap Tolerance: Maintain a uniform gap of 1/8" +/- 1/32".
 - 12. Straightness (camber and sweep) Tolerance: Maintain one half the standard camber and sweep tolerances for rolled shapes in ASTM A6, per AISC 303 Section 10.2.2.

3.02 Erection

- A. The Contractor will be responsible to erect the complete structural frame plumb and true to line and grade, in conformance with the AISC Code of Standard Practice.
- B. Temporary Bracing and Shoring:

1. The Contractor shall temporarily brace the frame in both directions and shall maintain columns plumb until the final connections of the framework and construction of diaphragms are complete.
 2. The Contractor shall provide such temporary shoring and additional bracing of steel frame as required to adequately and safely support any or all loads imposed upon the structure during construction.
 3. Submit shop drawings for temporary bracing and shoring in accordance with the requirements of Part 1.05 "Submittals", of this specification section.
- C. Field Painting:
1. After erection, all field welds, field bolts and abraded or scratched surfaces shall be cleaned and given an additional spot coat of the same paint used for the shop coat. The entire work shall be left in a neat, clean and acceptable condition.

3.03 Field Quality Control

- A. Inspections: The Owner's agent will perform the inspections shown on the contract drawings.
- B. Contractor:
- The Contractor shall hire the Engineer responsible for the design of temporary bracing and shoring to inspect the work as detailed on the reviewed shop drawings
1. The Engineer responsible for design, temporary bracing and shoring shall write a letter to the Architect certifying construction of temporary bracing and shoring is in accordance with the reviewed shop drawings, prior to start of construction requiring temporary bracing or shoring.

END OF SECTION

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**Section 05 50 00
Metal Fabrications**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Shop fabricated steel and aluminum items.

1.02 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.
- B. Section 05 12 00 - Structural Steel Framing: Structural steel column anchor bolts.
- C. Section 06100 - Rough Carpentry
- D. Section 06410 - Custom Cabinets
- E. Section 09 91 13 - Exterior Painting: Paint finish.

1.03 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.
- D. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.
- E. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- F. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.
- G. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015.
- H. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).
- I. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

- J. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

1.05 QUALITY ASSURANCE

- A. Design trellis assemblies under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in California.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.
- D. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- E. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- F. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 MATERIALS - ALUMINUM

- A. Extruded Aluminum: ASTM B 221 (ASTM B 221M), 6063 alloy, T6 temper.
- B. Bolts, Nuts, and Washers: Stainless steel.

2.03 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. 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.

- D. Furnish components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.04 FABRICATED ITEMS

- A. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish.
- B. All support and opening steel components required for Bi-Folding Apparatus Bay Doors, finish to match bi folding apparatus bay doors.
- C. All support and opening steel components required for Sectional Overhead doors, finish to match adjacent wall surface.
- D. Steel countertop support bracket: 1/4" thick minimum steel angle as detailed on drawings, prime paint finish.
- E. Fabricated Steel Hanging Rod and Supports: as detailed on drawings. Grind all welds. Prime paint finish all parts, except hanging rod to be stainless steel to fit standard hanger size.

2.05 FINISHES - STEEL

- A. Prime paint steel items.
 - 1. Exceptions: Galvanize items to be embedded in concrete or masonry.
 - 2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.
- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Prime Painting: One coat.
- E. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

2.06 FINISHES - ALUMINUM

- A. Class I Color Anodized Finish: AAMA 611 AA-C22A44 Electrolytically deposited colored anodic coating not less than 0.7 mils thick; dark bronze.

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.

3.02 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.

3.03 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Perform field welding in accordance with AWS D1.1/D1.1M.
- D. Obtain approval prior to site cutting or making adjustments not scheduled.
- E. After erection, prime welds, abrasions and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.
- F. Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting. Apply or brush or spray to provide minimum dry film thickness of 0.051 mm (2.0 mils).
- G. At all galvanized products, clean all damaged areas and re-coat using specified galvanizing coating per manufacturer's criteria.

3.04 TOLERANCES

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

END OF SECTION

Section 05 51 33

Ladders

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum access ladders.

1.02 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Blocking for ladders

1.03 REFERENCE STANDARDS

- A. AA - Aluminum Association.
- B. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- C. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- D. OSHA 1910.27 - Fixed Ladders.

1.04 SUBMITTALS

- A. See Section , for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product.
- C. Shop Drawings:
 - 1. Detail fabrication and erection of each ladder indicated. Include plans, elevations, sections, and details of metal fabrications and their connections.
 - 2. Provide templates for anchors and bolts specified for installation under other Sections.
 - 3. Provide reaction loads for each hanger and bracket.
- D. Provide LEED submittal forms with the product submittal for each different product and manufacturer. Recycled content, regional distance and materials costs must be identified for each manufacturer and product. Submittals without the LEED forms will be rejected as incomplete. Refer to Specification Section 01 3516 – LEED Submittal Forms.
- E. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in County's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Product Qualification: Product design shall comply with OSHA 1910.27 minimum standards for ladders.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.

1.07 FIELD CONDITIONS

- A. Field Measurements: Verify dimensions by field measurement before fabrication.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, indicate established dimensions on shop drawing submittal and proceed with fabrication.

1.08 WARRANTY

- A. Correct defective Work within a five year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. O'Keeffe's, Inc.: www.okeeffes.com - Basis of design
- B. Alaco Ladder Company: [//alacoladder.com](http://alacoladder.com)
- C. Precision Ladders, LLC: www.precisionladders.com

2.02 APPLICATIONS

- A. Fixed Access Ladder:
 - 1. Heavy Duty Tubular Rail.
 - a. Model 501 : O'Keeffe's
 - b. Model 560 Fixed Wall Ladder: Alaco
 - c. Fixed Ladder to Roof Hatch: Precision Ladders
- B. Accessory Options
 - 1. Safety Post

2.03 MATERIALS

- A. Aluminum Sheet: Alloy 5005-H34 to comply with ASTM B209

- B. Aluminum Extrusions: Alloy 6063-T6 to comply with ASTM B221

2.04 FABRICATION

- A. Rungs: Not less than 1-1/4 inches (32 mm) in section and 18-3/8 inches (467mm) long, formed from tubular aluminum extrusions. Squared and deeply serrated on all sides.
 - 1. Rungs shall withstand a 1,500 pound (454 kg) load without deformation or failure.
- B. Heavy Duty Tubular Side Rails: Assembled from two interlocking aluminum extrusions no less than 1/8 inch (3 mm) wall thickness by 3 inches (76 mm) wide. Construction shall be self-locking stainless steel fasteners, full penetration TIG welds and clean, smooth and burr-free surfaces.
- C. Ladder Safety Post: Retractable hand hold and tie off.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Coordinate anchorages. Furnish setting drawings, templates, and anchorage structural loads for fastener resistance.
- B. Do not begin installation until supporting structure is complete and ladder installation will not interfere with supporting structure work.
- C. If supporting structure is the responsibility of another installer, notify Architect of unsatisfactory supporting work before proceeding.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions and in proper relationship with adjacent construction.

3.03 PROTECTION

- A. Protect installed products until completion of project.
- B. B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

Section 06 1000
Rough Carpentry

PART 1 GENERAL

1.01 Applicable Section

- A. The requirements/provisions of the General and Supplementary Conditions and Division 1 Specification Section shall apply to this section.

1.02 Description Of Work

- A. The work included under this section consists of furnishing all material, supplies, equipment, tools, transportation and facilities and performing all labor and services necessary for, required in connection with or properly incidental to furnishing and installing rough carpentry, as described in this section of the specifications, shown on the accompanying drawings, or reasonably implied therefrom.
- B. Work Included:
 - 1. Furnishing and installing wood framing and sheathing
 - 2. Furnishing and installing glu-lam beams
 - 3. Furnishing and installing plywood sheathing
 - 4. Furnishing and installing light gage metal connectors
 - 5. Furnishing and installing bolts, lag screws, washers, spikes and nails necessary for connecting wood framing and sheathing
 - 6. Installing miscellaneous metal connectors
- C. Temporary bracing
- D. Related Work Specified Elsewhere:
 - 1. Concrete Formwork; Section 03 1000
 - 2. Structural Steel and Miscellaneous Iron; Section 05 1200

1.03 Reference Standards

- A. The following is a list of reference standards referred to in this portion of the specifications.
 - 1. ASTM A307, "Specification for Carbon Steel Externally Threaded Standard Fasteners"
 - 2. W.C.L.I.B., "Standard Grading and Dressing Rules No. 17."
 - 3. Federal Specification FF-N-105B with Interim Amendment 4.

1.04 Quality Assurance

- A. Codes and Standards: Comply with all Federal, State and Local Codes and Safety Regulations. In addition, comply with the provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:
 - 1. California Building Code, current governing edition.
 - 2. National Forest Products Association, "National Design Specification for Wood Construction", current edition.
 - 3. American Plywood Association, "U.S. Product Standard PS1-09"

4. American Institute of Timber Construction, American National Standard ANSI/AITC A190.1-2012 for Wood Products-Structural Glued Laminated Timber"
- B. Grade marks:
 1. All framing lumber shall be identified by the grade stamp of the West Coast Lumber Inspection Bureau.
 2. All plywood shall be identified as to species, grade, and glue type, and shall bear the identification grade mark of the American Plywood Association.
 3. All glu-lam beams shall be stamped with an AITC product quality mark.
- C. Certificates of Conformance: The Contractor shall provide AITC Certificate of Conformance for glu-lam beams in accordance with the requirements of Part 1.05, "Submittals", of this Specification Section.
- D. Testing and Inspection:
 1. The Owner shall employ an independent testing laboratory or the Engineer as the Owner's agent to perform the inspections and tests shown on the contract drawings and submit certified test results. The Contractor will cooperate with and notify Owner's agent at least 24 hours in advance of inspections required:

1.05 Submittals

- A. General Requirements
 1. Submittals shall be made to Architect in accordance with the requirements of Division 1 General Requirements of these specifications.
 2. Construction of wood framing, glu-lam erection, and sheathing shall not begin until Contractor has received submittals reviewed by Architect governing all aspects of the intended work.
- B. Shop Drawings: Shop drawings for glu-lam beam fabrication shall be submitted that show beam lengths, sizes, camber, seat cuts, notches, and all details of fabrication including, grade, type of glue, combination type, appearance grade, and type of wrapping.
- C. Product Data: Manufacturer's catalog sheets including instructions for use and description of application shall be provided on each of the following materials:
 1. Light gage metal connectors
- D. Certificates of Conformance: The Contractor shall provide a Certificate of Conformance meeting the requirements of AITC for all glu-lam beams.

1.06 Delivery, Storage And Handling

- A. Deliver and store lumber glu-lam beams on sleepers and cover for protection. See general conditions for additional delivery and storage requirements.
- B. Glu-lam beams shall be individually wrapped for delivery.

1.07 Sequencing And Scheduling

- A. Obtain information and instructions from other trades and suppliers in ample time to schedule and coordinate the installation of items furnished by them to be installed prior to or in conjunction with rough carpentry so provision for their work can be made without delaying the project.
- B. Do any cutting and repairing made necessary by failure or delay in complying with these requirements, at no cost to Owner.

PART 2 PRODUCTS

2.01 Framing

- A. General: Framing shall be Douglas Fir Coast Region, conforming to West Coast Lumber Inspection Bureau Standard Grading and Dressing Rule No. 17, as amended to date.
 - 1. 2x, 3x, 4x, plates, joists, purlins and beams, No. 1 and better (1200F-b), Para. 123-b, unless noted otherwise on the drawings.
 - 2. 2x, 3x, 4x, joists, purlins and beams, Select Structural (1500F-b), 123-a, where noted on the drawings.
 - 3. 6x beams, Dense No. 1 (1550F-b). Para 130-bb.
 - 4. 2x, 3x, 4x ledgers, No. 1 (1000F-b), Para. 123-b, unless noted otherwise on the drawings.
 - 5. 4x4 posts, No. 1 (1500F-c), Para. 124-b, unless noted otherwise on the drawings.
 - 6. 4x6 posts, No. 1 (1500F-c), Para. 123-b, unless noted otherwise on the drawings.
 - 7. 6x6 and larger posts, Dense No. 1, (1200F-c), Para. 131-bb.
 - 8. 2x, 3x studs and blocking, No. 1 (1000F-b), Para. 123-b.
 - 9. Foundation plates: Pressure treated Douglas Fir No. 1.
- B. All framing lumber 6" or larger in the least dimension shall be F.O.H.C.

2.02 Plywood

- A. General: Plywood shall conform to U.S. Product Standard PS 1-09, American Plywood Association. Each sheet shall be stamped with the PS and/or APA grademark.
- B. Roof Plywood
 - 1. Shall be 5 ply exposure 1, CDX, span rating 32/16, Species Group 2 or better.
- C. Wall Plywood
 - 1. Shall be 3 ply exposure 1, CDX, span rating 24/0, Species Group 2 or better.

2.03 Laminated Members

- A. Laminated members not exposed to weather shall be Douglas Fir Coast Region unless noted otherwise on contract drawings. Members shall be in conformance with the Standard Specifications for Structural Glued Laminated Timber per ANSI A190.1 - 2012. Laminations shall conform to West Coast Lumber Inspection Bureau Standard Grading and Dressing Rule No. 17, as amended to date.
 - 1. Glu-lam beams shall be industrial grade unless noted otherwise on the contract drawings.
 - 2. AITC combination symbol 24F-V4, laminations DF/DF for simple span beams.
 - 3. AITC combination symbol 24F-V8, laminations DF/DF at continuous span beams and cantilevers.
- B. Laminated members exposed to weather shall be Alaska Cedar in conformance with the Standard Specifications for Structural Glued Laminated Timber per ANSI A 190.1-2012.
 - 1. Glu-lam beams shall be appearance grade.
 - 2. AITC combination symbol 20F-V12, laminations AC/AC for simple span beams.

2.04 Engineered Wood Members

- A. Laminated-Veneer Lumber: A composite of wood veneers with grain primarily parallel to member lengths, manufactured with an exterior-type adhesive complying with ASTM D2559. Product has the following allowable design values as determined according to ASTM D5456:

1. Extreme Fiber Stress in Bending, Edgewise: 2900 psi for 12-inch nominal-depth members.
2. Modulus of Elasticity, Edgewise: 2,000,000 psi.

2.05 Light Gage Metal Connections

- A. Light gage metal connectors shall be Simpson Company Strong Tie Connectors, or equal unless noted otherwise on the drawings.

2.06 Nails

- A. Nails shall be bright common wire nails, galvanized for exterior work and conform to Federal Specification FF-N-105B.
- B. Nailing shall conform to CBC Table 2304.10.1 unless otherwise noted.
- C. Nails in pressure treated lumber shall be hot dipped galvanized steel in compliance with ASTM A153.

2.07 Screws

- A. Lag screws shall conform to ANSI/ASME Standard B18.2.1.
- B. Wood screws shall conform to ANSI/ASME Standard B18.6.1.

2.08 Bolts

- A. Bolts shall conform to ASTM A307, manufactured to American Standard Bolt and Nut dimensions with "Free Fit - Class 2" threads.
- B. Bolts in pressure treated lumber shall be hot dipped galvanized steel in compliance with ASTM A153.

2.09 Preservative Treatment For Wood

- A. Preservative Treatment for Wood: Water-borne, non-arsenic, non-chromium type complying with AWPAs Standard U1. Preservative treatment shall not contain pentachlorophenol, arsenic compounds, or creosote. In addition, the preservative treatment shall comply with the following:
 1. Material: Paintable.
 2. Comply with CARB limit on VOCs of 350 g/L using EPA Test Method 24.
 3. Moisture Content: After treatment, re-dry wood to be used in enclosed locations to a moisture content of 19% or less.
 4. Retreat all field cut ends and surfaces.

2.10 Fire-Retardant-Treated Wood

- A. Fire Retardant Treatment: Waterborne chemical treatment to comply with AWPAs Standard P-5, achieve a flame spread index of 25 or less when tested in accordance with ASTM E84, and show no evidence of significant progressive combustion when the test is continued for an additional 20-minute period. Additionally, the flame front shall not progress more than 10.5 feet beyond the centerline of the burners at any time during the test. Use of ammonium phosphates is prohibited.
- B. Apply in compliance with the applicable AWPAs Standard for type of wood and application.

- C. Provide fire retardant treatment for all wood noted on the Drawings to receive it.
- D. Where treated items are indicated on the Drawings to receive a transparent or opaque paint finish, use a fire retardant treatment which will not bleed through or adversely affect the bond of the finish material.
- E. Structural performance of fire retardant wood shall meet requirements of ASTM D5664 for lumber & ASTM D5516/D6305 for plywood.
- F. Provide labeling in conformance with CBC Section 2303.2.4 on all fire treated material delivered to the job site.
- G. Acceptable manufactures and products:
 - 1. Koppers Performance Chemicals FirePRO
 - 2. Hoover Treated Wood Products, Inc. Pyro-Guard
 - 3. Hoover Treated Wood Products, Inc. Exterior Fire-X
 - 4. Approved Equal

PART 3 EXECUTION

3.01 General Requirements

- A. All framing operations shall conform to the requirements of the California Building Code.
- B. Set horizontal and sloped members with crown up. Do not notch, bore or cut members for pipes, ducts, conduits, or other reasons except as shown on the drawings or as specifically approved by the Architect/Engineer. Make all bearings full and all blocking solid unless otherwise indicated on the drawings. Finish all bearing surfaces on which structural members are to rest so as to give sure and even support. Where framing members slope, cut or notch the ends as required to give uniform bearing surface.
- C. Joists shall be set with the crowning edge up except at cantilevers.
- D. Solid blocking shall be placed at ends of spans and over supports. Cross-Bridging or solid blocking in spans shall not exceed 8 feet or less if shown on structural drawings.
- E. Furnish and set all columns and studs to size, centers, and locations indicated on the drawings. Unless marked otherwise, studs for furring and partitions shall be 2x4 or 2x6, set 16" o.c. plates on concrete floors shall not be set until the concrete is finished. Cripples shall be run to the floor plates.
- F. Remove all wood, including form lumber, scrap lumber, shavings and sawdust in contact with ground. Leave no wood buried in any fill or backfill.
- G. Furring and blocking shall be furnished and installed where required for reception of wallboard, formation or architectural features, concealment of pipes, conduits, ducts, attachment of supports for towel holders, toilet paper holders, and other fixtures. Contractor shall consult with the trades concerned and set furring and blocking they require.
- H. Fire Blocking shall be installed as shown on drawings and in accordance with the applicable Building Code.
- I. Framing of openings through walls, floors, attics, and roofs shall be provided for roof vents, mechanical equipment, lighting fixtures, ducts, etc. Where one or more joists are cut, the joists supporting the trimmers shall be framed in accordance with the drawings or if not detailed shall be doubled and well spiked. Where continuation of three or more joists is interrupted, the abutting headers and joists shall be reinforced with approved type of joists hangers.
- J. Center joints or plywood accurately over supports and nail into solid wood. Protect all plywood from moisture by use of all required waterproof covering until the plywood has in turn been covered by the next succeeding component or finish.

- K. Lumber not grade stamped, and lumber of improper grade, shall be removed from the job site and immediately replaced by grade stamped lumber of the proper grade.
- L. Other Materials: All other lumber materials, not specifically described but required for the proper completion of the work, shall be new, first quality of their respective kinds and subject to the approval of the Architect/Engineer.
- M. Where the plans do not require solid blocking or a tongue and groove connection at edges of plywood or OSB sheathing, the sheathing edges shall be supported with ply clips or ply cleats.

3.02 Examination

- A. Surface Conditions: Prior to the work of this section, carefully inspect the installed work of other trades and verify that all such work has been so installed as to allow rough carpentry to produce surfaces to the required design.

3.03 Workmanship

- A. All rough carpentry shall produce joints true, tight, and well nailed with all members assembled in accordance with the drawings and with all pertinent regulations.
- B. Cut all wood members to fit. Do not shim.
- C. Erect all members straight, plumb and accurately located.
- D. Carefully select all structural members. Select individual pieces so that knots and obvious defects will not interfere with making proper connections. Lumber may be rejected by the Architect, whether or not it has been installed, for excessive warp, twist, bow, or crook, or for mildew, fungus or mold as well as for improper cutting or fitting. Cut out and discard all defects which render a piece unable to serve its intended function.

3.04 Installation

- A. Plates: Plates for partitions and walls shall be single at bottom and double at top. Splices in top plates shall be staggered not less than 48". Where plates are cut for passing pipes and similar items, they shall be reinforced on both sides with 1/8"x3"x18" steel plates punched for 10d nails 6" on center, staggered.
- B. Power Driven Inserts: Wherever furring of any kind is attached to concrete or masonry, including lower plates to floors, the members shall be secured with 1/4" power driven inserts. Plates anchored to concrete floors shall be attached with pins not over 3 feet on center. All studs on vertical furring shall be attached with pins not over 4 feet on center. Each insert shall penetrate the concrete to a minimum of 1-1/2". Use washers with all inserts.

3.05 Erection

- A. The Contractor will be responsible to erect the wood framing true to line and grade.
- B. Temporary Bracing and Shoring:
 - 1. The Contractor shall temporarily brace the wood framing in both directions and shall maintain walls, joists, beams, and other framing members plumb until the final connections of the framework and construction of diaphragms are complete.
 - 2. The Contractor shall provide such temporary shoring and additional bracing of wood framing as required to adequately and safely support any or all loads imposed upon the structure during construction.

3.06 Clean Up

- A. In addition to the requirements of General Conditions, keep premises clean and clear of debris caused from this portion of the work. Failure to perform clean up within 24 hours' notice by the Architect or General Contractor shall be considered adequate grounds for having the work done by others at this subcontractor's expense.

3.07 Field Quality Control

- A. Inspections: The Owner's agent will perform the inspections as shown on the contract drawings.

END OF SECTION

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Section 06 1960
Prefabricated Wood I-Joists

PART 1 GENERAL

1.01 Applicable Sections

- A. The requirements/provisions of the General and Supplementary Conditions and Division 1 Specification Section shall apply to this section.

1.02 Description Of Work

- A. The work included under this section consists of designing, fabricating, and installing OSB web joists as described in this section of the specifications, shown on the accompanying drawings or reasonably implied therefrom, except as hereinafter specifically excluded, including, but not limited to these major items.
- B. Work Included:
 - 1. Design of all Wood I-Joists.
 - 2. Fabrication and erection of all Wood I-Joists as shown or called on the contract drawings.
 - 3. All loose material such as bolts, clips, nails, and bridging required in connection with the installation of Wood I-Joists.
 - 4. All material that is supported by or attached to Wood I-Joists as required to trim openings shown on the architectural and structural drawings.
- C. Related Work Specified Elsewhere:
 - 1. Rough Carpentry; Section 06 1000

1.03 Reference Standards

- A. The following is a list of reference standards referred to in this portion of the specification:
 - 1. ASTM A307, "Specification for Carbon Steel Externally Threaded Standard Fasteners"
 - 2. W.C.L.I.B. "Standard Grading and Dressing Rules No. 17"

1.04 Quality Assurance

- A. Codes and Standards: Comply with all Federal, State, and Local codes and safety regulations. In addition, the fabrication and erection of Wood I-Joists shall comply with all the applicable provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:
 - 1. "California Building Code", current governing edition.
 - 2. National Forest Products Association, "National Design Specification for Wood Construction."
- B. Qualifications:
 - 1. Fabrication and erection of Wood I-Joists shall be by a manufacturer with 5 years minimum experience in the design, fabrication and erection of Wood I-Joists. The manufacturer shall also have been in business to fabricate and erect

- 2. Wood I-Joists continuously over the past 5 years.
- 2. The design and detailing of Wood I-Joists shall be prepared, stamped, and signed by a registered civil engineer of the state of California.
- C. Testing and Inspection:
 - 1. General:
 - a. All materials and work shall be subject to inspection at the fabricating shop, and at the building site. Material or workmanship not complying fully with the drawings and specifications will be rejected.
 - b. If the inspector, through oversight or otherwise, has accepted material or work which is defective or contrary to specifications, this material or work, regardless of state of completion, may be rejected.
 - 2. Owner: The Owner shall employ an independent testing agency or the Engineer as the Owner's agent to perform the inspections and tests shown on the contract drawings and submit certified test results. The contractor will cooperate with and notify Owner's agent at least 48 hours in advance of inspections required.

1.05 Submittals

- A. General Requirements:
 - 1. Submittals shall be made to Architect in accordance with the requirements of Division 1, General Requirements of these specifications.
 - 2. Construction, and fabrication or ordering of materials shall not begin until Contractor has received submittals reviewed by Architect governing all aspects of the intended work.
- B. Shop Drawings:
 - 1. Shop drawings shall show the complete I-joist plan layout. The shop drawings shall provide an elevation of each different type of joist showing dimensional layout, member sizes, type of material and connection details. The shop drawings shall also show all miscellaneous details including continuous bridging and diagonal bracing details. The shop drawings shall include specifications for all materials to be used in joist fabrication and erection. The allowable stresses for each type of material shall also be shown.
 - 2. Complete design calculations and/or design verification tests shall be furnished along with the shop drawings. The calculations shall show all stresses in members and connections for design loads including dead loads, live loads, wind loads, etc. specified by the California Building Code and these specifications. Deflections for all members due to design loads shall also be included.
 - 3. Calculations and shop drawings shall be prepared and signed by a civil or structural engineer, registered in the State of California.
 - 4. Joist manufacturer shall obtain all necessary approvals from the public agencies governing construction.

PART 2 PRODUCTS

2.01 Design

- A. Design of Wood I-Joists, bridging, and diagonal bracing shall be in strict accordance with the California Building Code.
- B. Wood I-Joist depths and layout shall be as called or shown on the structural drawings.

Diagonal or continuous bridging shall be of a size and layout required by design and shown on the shop drawings. The joist designer shall coordinate the size and location of bridging as required to brace joists.

- C. Wood I-Joists shall be supplied by the same fabricator (manufacturer) to insure uniformity of details and appearance.
- D. It is the intent of the drawings and these specifications that the Wood I-Joists provide a neat uniform appearance as accepted by the Architect.
- E. Design Loads: See Contract Drawings
- F. Maximum Allowable Deflections:

<u>Level</u>	<u>Location</u>	<u>Live Load</u>	<u>Dead + Live Load</u>	<u>Maximum</u>
Roof	Cantilever Span	L/300	L/180	1”
	Interior Span	L/360	L/240	1”
Floor	Cantilever Span	L/600	L/240	1”
	Interior Span	L/600	L/240	1”

- G. Cantilever spans shall have identical limitations with L=2x overhang. 1 inch maximum

2.02 Materials

- A. Materials for fabrication of Wood I-Joists shall be in accordance with the Specifications shown on the shop drawings prepared by the joist design engineer.
- B. All lumber shall conform to the “Standard Grading and Dressing rules #17”, and as specified by the truss design engineer.
- C. Flanges shall be laminated veneer lumber; machine stress rated and shall have a moisture content of between 7 and 16 percent at time of fabrication.
- D. Joists shall be manufactured to the following tolerances:
 - 1. Joist Depth = +/- 1/16 inch
 - 2. Flange Width = +/- 1/16 inch

PART 3 EXECUTION

3.01 Workmanship

- A. The workmanship shall be of the highest quality found in contemporary structural work.

3.02 ERECTION

- A. The Contractor will be responsible to erect the Wood I-Joists plumb and true to line and grade.
- B. Handling and erection shall be in accordance with these specifications and the referenced standards. Wood I-Joists and accessories shall be protected from harmful elements when stored at the job site. Store above the ground on platforms, pallets, or similar support. Keep trusses free of dirt and other deleterious matter.
- C. Replace all joists damaged by shipping, storage, or erection.
- D. Erection shall be by an installer fully familiar with the manufacturer's product and having previous installation experience.
- E. Temporary Bracing and Shoring:

1. The Contractor shall temporarily brace the Wood I-Joists in both directions until the final connections of the framework and construction of diaphragms are complete.
2. The Contractor shall provide such temporary shoring and additional bracing of structural frame as required to adequately and safely support any or all loads imposed upon the structure during construction.

END OF SECTION

Section 06 20 00

Finish Carpentry

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Finish carpentry items.
- B. Wood casings and moldings.
- C. Wood Shower Bench Slats

1.02 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- B. Section 06 41 00 - Architectural Wood Casework: Shop fabricated custom cabinet work.
- C. Section 09 91 13 - Exterior Painting: Painting of finish carpentry items.

1.03 REFERENCE STANDARDS

- A. ANSI A135.4 - American National Standard for Basic Hardboard; 2012.
- B. ANSI A208.1 - American National Standard for Particleboard; 2022.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026.
- D. NHLA G-101 - Rules for the Measurement & Inspection of Hardwood & Cypress; 2011.
- E. WI (MAN) - Manual of Millwork; Woodwork Institute; 2003.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
 - 1. Scale of Drawings: 1-1/2 inch to 1 foot, minimum.
- C. Samples: Submit two samples of wood trim 12 inch long.

1.05 QUALITY ASSURANCE

- A. Grade materials in accordance with the following:

1. Softwood Lumber: In accordance with rules certified by ALSC; www.alsc.org.
 2. Plywood: Certified by the American Plywood Association.
 3. Hardwood Lumber: In accordance with NHLA Grading Rules; www.natlhardwood.org.
- B. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

1.06 REGULATORY REQUIREMENTS

- A. Conform to applicable code for fire retardant requirements.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Protect from moisture damage.

1.08 PROJECT CONDITIONS

- A. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.
- B. Coordinate the work with installation of associated and adjacent components.

PART 2 PRODUCTS

2.01 FINISH CARPENTRY ITEMS

- A. Unless otherwise indicated provide products of quality specified by AWI Architectural Woodwork Quality Standards Illustrated for Premium grade.
- B. Interior Woodwork Items:
1. Moldings, Bases, Casings, and Miscellaneous Trim: Clear white pine; prepare for paint finish.

2.02 WOOD-BASED COMPONENTS

2.03 LUMBER MATERIALS

- A. Softwood Lumber: pine species, smooth sawn, maximum moisture content of 6 percent; with vertical grain, of quality suitable for transparent finish.
- B. Hardwood Lumber: Birch species, smooth sawn, maximum moisture content of 6 percent ; with vertical grain , of quality suitable for transparent finish.
1. Grading: In accordance with NHLA G-101 Grading Rules; www.nhla.org.

2.04 WOOD TREATMENT

- A. Redry wood after pressure treatment to maximum ____ percent moisture content.

2.05 FABRICATION

- A. Shop assemble work for delivery to site, permitting passage through building openings.
- B. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

2.06 SHOP FINISHING

- A. Sand work smooth and set exposed nails and screws.
- B. Apply wood filler in exposed nail and screw indentations.
- C. Finish work in accordance with Woodwork Institute Manual of Millwork, Section 5, System #7a - synthetic enamel.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.02 INSTALLATION

- A. Set and secure materials and components in place, plumb and level.
- B. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

3.03 PREPARATION FOR SITE FINISHING

- A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.

3.04 TOLERANCES

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

END OF SECTION

Section 06 41 00
Architectural Wood Casework

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Specially fabricated cabinet units.
- B. Hardware.

1.02 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- B. Section 12 36 00 - Countertops.

1.03 REFERENCE STANDARDS

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).
- B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.
- C. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.
- D. ASTM D 1037 - 99 Standard Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials
- E. WI (MAN) - Manual of Millwork; Woodwork Institute; 2003.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes. Shop Drawings shall have WI, Certified Compliance Label affixed to first page of drawing set.
- C. Product Data: Provide data for hardware accessories. Provide MSDS Sheets for all composite wood and agrifiber products, adhesives, and sealants used.
- D. Samples: Submit actual sample items of proposed pulls, plastic laminates, hinges, plastic laminates, shelf standards, plastic laminates, locksets, plastic laminates, and plastic laminates, demonstrating hardware design, quality, and finish.

1.05 QUALITY ASSURANCE

- A. Perform work in accordance with WI Manual of Millwork, Custom quality, unless other quality is indicated for specific items. The millwork supplier shall issue a W.I. Certificate Compliance Certificate indicating the grade of millwork products to be furnished for this job and certifying that they will fully meet all the requirements of the grade specified. Each unit of casework shall bear the W.I. Certificate Compliance label. Each plastic laminate countertop shall bear the W.I. Certified Compliance label. Upon the completion of the installation, a W.I. Certified Compliance shall be issued for the installation. The type of construction used must meet the seismic force requirements of Title 24.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect units from moisture damage.
- B. Delivery shall only be made when the area of operation is enclosed, all wet work is dry, all overhead work is complete, and the area broom clean.

1.07 FIELD CONDITIONS

- A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.
- B. The HVAC system shall be on and functioning, and the architectural millwork shall be acclimated to these conditions for 72 hours prior to installation.

PART 2 PRODUCTS

2.01 CABINETS

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

2.02 LUMBER MATERIALS

- A. Softwood Lumber: NIST PS 20; Graded in accordance with WI Manual of Millwork, Grade II/Custom; average moisture content of 5-10 percent; species as recommended by manufacturer.

2.03 PANEL MATERIALS

- A. Hardwood Faced Plywood: HPVA HP-1; graded in accordance with WI Manual of Millwork, core of lumber; exterior glue ; thickness 3/4";
 - 1. Exposed Open Shelving
 - 2. Semi Exposed Shelving
- B. Particleboard shall not be used

- C. Medium Density Fiberboard (MDF): ANSI A208.2; type as specified in WI Manual of Millwork; composed of wood fibers pressure bonded with moisture resistant formaldehyde free adhesive to suit application; sanded faces; thickness as required.
 - 1. Medex, as manufactured by Sierra Pine or approved equal
 - 2. Located at all casework construction, except as identified above.

2.04 LAMINATE MATERIALS

- A. Manufacturers:
 - 1. Panolam Industries International, Inc; Nevamar: www.nevamar.com.
 - 2. Or approved equal, prior to bidding
- B. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for all exposed applications as scheduled.
- C. Melamine finish at all semi-exposed cabinet shelving, divisions and faces.
- D. Interior faces of cabinet doors to be faced with the same material as exposed surfaces.

2.05 COUNTERTOPS

- A. Countertops: See Section 12 36 00.

2.06 ACCESSORIES

- A. Adhesive: Type recommended by fabricator to suit application.
- B. Plastic Edge Banding: Extruded PVC, convex shaped; smooth finish; self-locking serrated tongue; of width to match component thickness.
- C. Fasteners: Size and type to suit application.
- D. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.
- E. Concealed Joint Fasteners: Threaded steel.
- F. Grommets: Standard plastic grommets for cut-outs, in color to match adjacent surface.

2.07 HARDWARE

- A. Adjustable Shelf Supports: Standard side-mounted system using recessed metal shelf standards and coordinated self-rests, satin finish, for nominal 9/16 inch spacing adjustments.
 - 1. Standards, SP-1820, manufactured by Sugatsune or approved equal.
 - 2. Supports; SP-15, manufactured by Sugatsune or approved equal.
- B. Drawer and Door Pulls: matte chrome zinc alloy pull handle.
 - 1. Product: EG-36160 MC manufactured by Sugatsune or approved equal

- C. Cabinet Locks: Keyed cylinder, two keys per lock, master keyed, steel with satin finish.
 - 1. Pin tumbler cylinder cam lock, National Lock 8102 Series or approved equal.
 - 2. Keying as selected. All locks shall be installed in a hole shaped the same shape as the cylinder of the lock to eliminate rotation. Round lock cylinders installed in round holes will not be allowed.
 - 3. Cabinet locks are to be installed at the following cabinet doors with the following requirements:
 - a. All locks will be keyed with one master key and one unique key.
 - b. Provide 4 copies of each unique key and a total of eight copies of the master key.
 - c. Bunkroom Lockers: Unique keys for each locker door.
- D. Cabinet Catches and Latches:
 - 1. Product: MC0099 manufactured by Sugatsune
 - 2. Product: 323A92 manufactured by Ives
 - 3. Substitutions: See Section 01600 - Product Requirements.
- E. Drawer Slides:
 - 1. Type: Full extension.
 - 2. Static Load Capacity: Commercial grade.
 - 3. Mounting: Side mounted.
 - 4. Stops: Integral type.
 - 5. Features: Provide self closing/stay closed type.
 - 6. Manufacturers:
 - a. Accuride International, Inc: www accuride.com.
 - b. Hettich America, LP; ____: www.hettich.com/#sle.
 - c. Knappe & Vogt Manufacturing Company: www.knappeandvogt.com.
 - d. Hettich:
 - e. Substitutions: See Section 01 61 00 - Product Requirements.
- F. Hinges: Five knuckle overlay hinge type, steel with polished finish.
 - 1. Manufacturers:
 - a. Rockford Process: www.rockfordprocesshingesandhardware.com
 - 1) **The "Rockford Hinge" - Five knuckle Overlay Hinge**
 - (a) Size to match cabinetry construction
 - b. Hettich America, LP: www.hettich.com/#sle.
 - c. Blum, Inc: www.blum.com.
 - d. Or approved equal,
 - e. Substitutions: See Section 01 61 00 - Product Requirements.
- G. Countertop Support Brackets:
 - 1. Product: BTK -480 manufactured by Sugatsune or approved equal
 - a. Color: Black
 - b. Capacity: 181 lbs
- H. Silencers: Clear vinyl silencers to be installed at each cabinet door
- I. Countertop Cable Grommets:
 - 1. Color: Black
 - 2. Diameter: 3"
 - 3. Features: Grommet to include cap

- J. Wardrobe Hook
 - 1. # 582 Double, Aluminum, Manufactured by Ives or approved equal.

2.08 FABRICATION

- A. Cabinets shall be fabricated to Woodwork Institute standards
 - 1. Grade: Premium
- B. Cabinet Style: Flush overlay.
- C. Cabinet Doors and Drawer Fronts: Flush style.
- D. Exceptions to WI standards
 - 1. Wall Hung Cabinets : Depth 14 inches
 - 2. Storage, Janitor, Closet and Utility Room Cabinets shall be of the same construction as typical cabinets.
 - 3. Shelves shall be designed as per schools and libraries, for a 50lb per square foot live load as per table 15-1.
 - 4. Exterior Edges: Include doors, drawer fronts, and front edge of vertical end panels and leg panels. Exterior edges are to be edged with heavy-duty 3mm PVC edge banding, color to match door or drawer front.
 - 5. Locate grommets as directed by Owner. Assume one per workstation
- E. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.
- F. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.
- G. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.
- H. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.
- I. Provide cutouts for plumbing fixtures. Verify locations of cutouts from on-site dimensions. Prime paint cut edges.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify location and sizes of utility rough-in associated with work of this section.

3.02 CASEWORK INSTALLATION

- A. Install work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.
- B. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.
- C. Use fixture attachments in concealed locations for wall mounted components.
- D. Use concealed joint fasteners to align and secure adjoining cabinet units.
- E. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- F. Secure cabinets to floor using appropriate angles and anchorages.
- G. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.
- H. Secure upper cabinets, counter bases, full height cabinets, and counter partitions to floor and wall using appropriate angles and anchorages to obtain seismic restraint per Title 24 Section 2336

3.03 ADJUSTING

- A. Adjust moving or operating parts to function smoothly and correctly.

3.04 CLEANING

- A. Defective work shall be repaired or replaced as directed by the Owner or his representative upon completion of installation.
- B. Shop finished surfaces shall be cleaned, touched-up as required and damaged or unrepairable areas shall be refinished or replaced as directed.
- C. Clean cabinetry free of debris. Installer shall be responsible for the immediate removal of all trash, crating, etc., associated with the cabinet installation.

3.05 SCHEDULES

- A. Finishes to be selected by architect from full line of colors and patterns. (Colors and Patterns are based on Nevamar as a standard of quality unless otherwise noted.)

EN

**Section 06 61 00
Cast Polymer Fabrications**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Cast plastic Shower Surrounds.

1.02 RELATED REQUIREMENTS

- A. Section 07650 - Flexible Flashing

1.03 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026.
- B. ANSI Z 124.3 - Plastic Lavatories.
- C. ANSI Z 124.6 - Plastic Sinks.
- D. ASTM D 256 - Standard Test Method for Determining the Pendulum Impact Resistance of Notched Specimens of Plastics.
- E. ASTM D 570 - Standard Test Method for Water Absorption
- F. ASTM D 638 - Standard Test Method for Tensile Properties
- G. ASTM D 696 - Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30 degrees C. And 30 degrees C.
- H. ASTM D 785 - Standard Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials.
- I. ASTM D 790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
- J. ASTM D 785 - Standard Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials.
- K. ASTM G 22 - Standard Practice for Determining Resistance of Plastics to Bacteria.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

- B. Samples: Submit samples of manufacturer's complete line for color selection by Architect

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with minimum three years of documented experience.
- B. Installer Qualifications: Work to be performed by workers who are thoroughly familiar with the methods of fabrication and installation of cast plastic and have a minimum experience of having installed at least 5 previous installations of similar

1.06 PROJECT CONDITIONS

- A. Verify that field measurements.
- B. Sequence Work to permit installation of adjacent affected construction, plumbing rough-in. Coordinate the installation of restroom / shower walls with shower pan installation and plumbing work.

1.07 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Provide manufacturer's warranty as follows for material replacement:
 - 1. 25-Year Limited Warranty on wall panels and trim kits
 - 2. 5-Year Limited Warranty against warping, blistering, loss of color, or fading on shower floors
- C. Contractor to provide one year warranty for installation

PART 2 PRODUCTS

2.01 MANUFACTURERS

2.02 MATERIALS

- A. Shower Floor: Single pan element in size per drawings and as specified in the plumbing documents.
- B. Shower Wall Panels: Corian wall finish panels to fit shower including corner molding and soap trays.
 - 1. Product Description: Homogenous compression molded material composed of acrylic resins or polyester/acrylic resin blend, fire-retardant filler materials, fiber reinforcement, and coloring agents meeting the following requirements:
 - a. Nominal sheet thickness: 0.250 inch (6.35 mm)
 - b. Surface burning characteristics in accordance with ASTM E 84:
 - 1) Flame spread 15, Smoke Developed Index 255.
 - c. Liquid Absorption, ASTM D 570, for 1/4 inch material thickness: 0.033 percent.
 - d. Izod Impact, ASTM D 256, Method A: 6.6 foot pounds per inch.

- e. Tensile Modulus, ASTM D 638 Nominal: 1.48 X 10⁶ pounds per square inch.
 - f. Thermal Expansion, ASTM D 696: 1.64 X 10⁻⁵ inch per inch per degree F, maximum.
 - g. Hardness, ASTM D 785, Barcol Impressor: 42.
 - h. Flexural Modulus, ASTM D 638: 1.22 X 10⁶ pounds per square inch.
 - i. Gloss Level 25% at 60°, NEMA LD 3, +/- 5%.
 - j. Stain Resistance, ANSI-Z 124.3, Passes.
 - k. Boiling Water Resistance, NEMA LD 3, Method 3.5: No effect.
 - l. High Temperature Resistance, NEMA LD 3, Method 3.6:
 - 1) No effect (sustain temperature up to 375° F).
 - m. Ball Impact Resistance, NEMA LD 3, Method 3.8, one pound ball, unsupported:
 - 1) Over 150", no damage.
 - n. Specific Gravity: 1.6 grams per cubic centimeter.
 - o. Approximate weight: 2 pounds per square foot in 1/4" sheet products.
 - p. NSF Food Zone and Splash Zone Compliant.
 - q. Bacterial Resistance, ASTM G 22: Pass.
 - r. Abrasion Resistance, ANSI-Z124.3, Passes.
- C. Shower Soap / Shampoo shelves:
- 1. Similar finish and color as wall panels.
 - 2. Minimum two shelves per shower.
 - a. Minimum thickness: 1/2 inch.
- D. Trim: To match finish and color of wall elements.
- 1. Minimum thickness: 1/4 inch.
- E. Accessories: As required for a complete installation and as recommended by manufacturer.

2.03 FABRICATION

- A. Fabricate components in shop to the greatest extent practical to sizes and shapes indicated, in accordance with approved shop drawings.
- B. Form joints between components using manufacturer's standard joint adhesive. Joints shall be inconspicuous in appearance and without voids.
- C. Provide holes and cutouts for plumbing and bath accessories as indicated on the drawings.
- D. Rout and finish component edges to a smooth, uniform finish.
- E. All surfaces shall have a uniform finish

2.04 FINISH

- A. Color: color as selected by architect from manufacturer's full line.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify substrates are prepared to receive cast polymer fabrications.
- B. Verify mechanical, electrical, and other building components affecting work of this section are placed and ready to receive work of this section.

3.02 PREPARATION

- A. Prepare substrates in accordance with manufacturer's written instructions.

3.03 INSTALLATION

- A. Install cast polymer units in accordance with manufacturer's written instructions.
- B. Remove adhesives, sealants and other stains upon completion of installation per manufacturer's written instructions.

3.04 TOLERANCES

- A. Maximum Variation from True Position: 1/4 inch.

3.05 CLEANING

- A. Clean exposed surfaces of installed units in accordance with manufacturer's instructions.

3.06 PROTECTION

- A. Protect installed cast polymer units from subsequent construction operations.

END OF SECTION

**Section 06 83 16
Fiberglass Reinforced Paneling**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fiberglass reinforced plastic panels.
- B. Trim.

1.02 RELATED REQUIREMENTS

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 09 51 00 - Acoustical Ceilings: Ceiling suspension system.

1.03 REFERENCE STANDARDS

- A. 9 CFR 416.2 - Regulatory Requirements Under the Federal Meat Inspection Act and the Poultry Products Inspection Act, Part 416-Sanitation; current edition.
- B. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics; 2010 (Reapproved 2018).
- C. ASTM D2583 - Standard Test Method for Indentation Hardness of Rigid Plastics by Means of Barcol Impressor; 2013a.
- D. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2012.
- E. ASTM D5319 - Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels; 2012.
- F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026.
- G. ISO 846 - Plastics - Evaluation of the Action of Microorganisms; 1997.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.

- C. Samples: Submit two samples ____ by ____ inch in size illustrating material and surface design of panels.
- D. Maintenance Materials: Furnish the following for County's use in maintenance of project.
 - 1. See Section 01 61 00 - Product Requirements, for additional provisions.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store panels flat, indoors, on a clean, dry surface. Remove packaging and allow panels to acclimate to room temperature for 48 hours prior to installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Fiberglass Reinforced Plastic Panels:
 - 1. Kemlite Company, Inc: www.frpdesignsolutions.com
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PANEL SYSTEMS

- A. Wall Panels:
 - 1. Panel Size: 4 by 8 feet.
 - 2. Panel Thickness: 0.10 inch.
 - 3. Surface Design: Embossed.
 - 4. Color: White.
 - 5. Attachment Method: Adhesive only, sealant joints, no trim.

2.03 MATERIALS

- A. Panels: Fiberglass reinforced plastic (FRP), complying with ASTM D5319.
 - 1. Surface Burning Characteristics: Maximum flame spread index of 25 and smoke developed index of 450; when system tested in accordance with ASTM E84.
 - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - 3. Scratch Resistance: Barcol hardness score greater than 35, when tested in accordance with ASTM D2583.
 - 4. Impact Strength: Greater than 6 ft lb force per inch, when tested in accordance with ASTM D256.
 - 5. Sanitation and Cleanability: Comply with 9 CFR 416.2.
 - 6. Chemical Cleanability: Excellent chemical resistance to common cleaners and detergents when tested in accordance with ISO 2812-1.
 - 7. Biological Resistance: Rating of 0, when tested in accordance with ISO 846.
- B. Trim: Vinyl; color coordinating with panel.
- C. Fasteners: Nylon rivets.
- D. Adhesive: Type recommended by panel manufacturer.

- E. Sealant: Type recommended by panel manufacturer; white.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions and substrate flatness before starting work.
- B. Verify that substrate conditions are ready to receive the work of this section.

3.02 INSTALLATION - WALLS

- A. Install panels in accordance with manufacturer's instructions.
- B. Cut and drill panels with carbide tipped saw blades, drill bits, or snips.
- C. Pre-drill fastener holes in panels, 1/8 inch greater in diameter than fastener, spaced as indicated by panel manufacturer.
- D. Apply adhesive to the back side of the panel using trowel as recommended by adhesive manufacturer.
- E. Apply panels to wall with seams plumb and pattern aligned with adjoining panels.
- F. Install panels with manufacturer's recommended gap for panel field and corner joints.
- G. Drive fasteners to provide snug fit, and do not over-tighten.
- H. Place trim on panel before fastening edges, as required.
- I. Fill channels in trim with sealant before attaching to panel.
- J. Install trim with adhesive and screws or nails, as required.
- K. Seal gaps at floor, ceiling, and between panels with applicable sealant to prevent moisture intrusion.
- L. Remove excess sealant after paneling is installed and prior to curing.

END OF SECTION

**Section 07 21 00
Board and Batt Insulation**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Thermal batt insulation and vapor retarder in exterior wall construction - R21.
- B. Sound insulation at all interior demising walls not otherwise thermally insulated - size to fill void 5-1/2" min.
- C. Sound insulation at all T-bar ceilings at all demising partitions of bunk rooms, hallways, restrooms, offices.
- D. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

1.02 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Installation requirements for board insulation over steep slope roof sheathing or roof structure.
- B. Section 09 2116 Gypsum Board Assemblies
- C. Section 09 5100 Acoustical Ceiling
- D. Section 07 54 00 - Thermoplastic Membrane Roofing: Installation requirements for board insulation over low slope roof deck.

1.03 QUALITY ASSURANCE

- A. Installer - Work to be performed only by workers thoroughly skilled and specially trained in the techniques of insulation, and who are completely familiar with the published recommendations of the manufacturer of the material being used. Installer to take care that facing material of batt insulation is not torn or punctured.
- B. Materials of this section shall provide continuity of thermal barrier at building enclosure elements.

1.04 REFERENCE STANDARDS

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

1.06 FIELD CONDITIONS

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

1.07 PRODUCT HANDLING

- A. Protection
 - 1. Insulating materials to be stored at the job site in a safe, dry place with all labels intact and legible at time of installation.
 - 2. Comply with manufacturer's recommendations for handling, storage and protection during installation. Use all means to protect insulating materials before, during, and after installation. Do not allow products to become wet, damp, or punctured.
- B. Replacements - In the event of damage, including water intrusion, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

1.08 SEQUENCING

- A. Sequence work to ensure fireproofing and firestop materials are in place before beginning work of this section.

PART 2 PRODUCTS

2.01 MINERAL FIBER BLANKET INSULATION MATERIALS

- A. Batt Insulation: ASTM C 665; preformed glass fiber batt; friction fit, conforming to the following:
 - 1. Surface Burning Characteristics: Flame spread index of 25 or less; smoke developed index of 50 or less, when tested in accordance with ASTM E 84.
 - 2. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
 - 3. Formaldehyde Content: Zero.
 - 4. Thermal Resistance: (Unless otherwise noted on plans with an increase value)
 - a. At Exterior Walls: R-19 Kraft Face Batts. (Also located at interior walls of Apparatus Bays and Fitness Room.)
 - b. Interior Wall Sound Insulation: fiberglass sound control batts minimum 3-5/8" thick.
 - 5. Manufacturer shall certify that a minimum of 25% of content of insulation is of recycled materials.
 - 6. Facing: Asphalt treated Kraft paper, one side.
 - 7. Products:

- a. CertainTeed Corporation: www.certainteed.com.
- b. Johns Manville: www.jm.com.
- c. Owens Corning Corporation: www.ocbuildingspec.com/#sle.
- 8. Substitutions: See Section 01 61 00 - Product Requirements.

2.02 ACCESSORIES

- A. Provide all other materials and products necessary for the proper completion of the work.
- B. Tape joints of rigid insulation in accordance with roofing and insulation manufacturers' instructions.
- C. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.
- D. Nails or Staples: Steel wire; electroplated or galvanized; type and size to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- B. 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 installation can properly begin.
- C. Verify that specified products may be installed in accordance with the original design and the manufacturer's recommendations.

3.02 BOARD INSTALLATION OVER LOW SLOPE ROOF DECK

- A. Board Installation Over Roof Deck, General: At Crickets for slope
 - 1. See applicable roofing specification section for specific board installation requirements.
 - 2. Fasten insulation to deck in accordance with roofing manufacturer's written instructions and applicable Factory Mutual requirements.
 - 3. Do not apply more insulation than can be covered with roofing on the same day.

3.03 BATT INSTALLATION

- A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
- B. Install in exterior wall and roof spaces without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

- E. Wire all ceiling insulation (that is not supported by gypsum board by running 16 gage wire diagonally or perpendicular to the insulation every 18 inches.
- F. Staple or nail facing flanges in place at maximum 6 inches on center.

3.04 PROTECTION

- A. Do not permit installed insulation to be damaged prior to its concealment.

3.05 ACOUSTIC BATTS AT T-BAR CEILINGS

- A. On first floor install acoustic batt insulation over all T-bar ceilings.

END OF SECTION

**Section 07 21 29
Sprayed Insulation**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Polyurethane spray foam applied to underside of roof sheathing.

1.02 REFERENCE STANDARDS

- A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2010.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on materials, describing insulation properties.
- C. Certificates: Certify that products of this section meet or exceed specified requirements.
- D. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.
- E. Manufacturer's Qualification Statement.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section and approved by manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Polyurethane spray foam insulation:
 - 1. Icynene Inc.; Icynene Classic Ultra Select: www.icynene.com

2.02 MATERIALS

- A. Spray Foam Insulation: Light density, open celled, 100% water-blown, conforming to the following.
 - 1. Thermal Resistance (R-Value/inch @75 deg F): ASTM C 518; 3.7 hr/sq ft/degree F/BTU
 - 2. Air Permeance (for 3 inches of material): ASTM E 2178; < 0.014 L/s.m2 @ 75 Pa
 - 3. Water Vapor Transmission (for 5.5 inches of material): ASTM E 96; 11 perms [627 ng/(Pa.s.m2)]
 - 4. Flame Spread and Smoke Developed Rating: ASTM E 84
 - a. Flame Spread: 20
 - b. Smoke Development: 340
 - 5. Fungal Growth: ASTM C 1338: no growth

2.03 ACCESSORIES

- A. Primer: As required by insulation manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are clean, dry, and free of matter that may inhibit adhesion.
- B. Review placement area to determine final location will not be within 3 inches of any heat source where the temperature will exceed 200 deg F per ASTM C 411 or in accordance with authorities having jurisdiction

3.02 PREPARATION

- A. Mask and protect adjacent surfaces from overspray or damage.
- B. Clean substrates and cavities of loose materials capable of interfering with insulation placement.
- C. Apply primer in accordance with manufacturer's instructions.
- D. Install insulation stops between rafters at wall/sloped roof construction to prevent insulation from covering soffit vents or from limiting air circulation from soffit to attic space.

3.03 INSTALLATION

- A. Install sprayed insulation in accordance with manufacturer's instructions.
- B. Install sprayed insulation to a uniform monolithic density without voids.
- C. Install to achieve a thermal resistance R-value of 30.

3.04 PROTECTION

- A. Do not permit subsequent construction work to disturb applied sprayed insulation.

END OF SECTION

**Section 07 25 00
Weather Barriers**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Water-resistive barriers.

1.02 RELATED REQUIREMENTS

1.03 DEFINITIONS

- A. Weather Barriers: Materials or assemblies forming water-resistive barriers, air barriers, vapor retarders, or combination of one or more assemblies.
- B. Water-Resistive Barriers: Materials or assemblies installed behind exterior wall coverings; designed to prevent liquid water from further penetration into exterior wall assembly.

1.04 REFERENCE STANDARDS

- A. ASTM D779 - Standard Test Method for Water Resistance of Paper, Paperboard, and Other Sheet Materials by the Dry Indicator Method; 2003.
- B. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2025.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026.
- D. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2024a.
- E. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials; 2013.
- F. ICC-ES AC308 - Acceptance Criteria for Water-Resistive Barriers; 2016, with Editorial Revision (2021).

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on material characteristics.
- C. Manufacturer's Installation Instructions: Indicate preparation, installation methods, and storage and handling criteria.

1.06 FIELD CONDITIONS

- A. Maintain temperature and humidity recommended by materials manufacturers before, during, and after installation.

PART 2 PRODUCTS

2.01 WEATHER BARRIER ASSEMBLIES

- A. Water-Resistive Barrier: Provide on exterior walls under exterior cladding.
 - 1. Under Portland cement stucco and fiber cement siding, use one layer of building paper installed over air barrier.
 - 2. Under stone veneer use one layer of building paper installed over air barrier.

2.02 WATER-RESISTIVE BARRIERS

- A. Building Paper: Asphalt-saturated kraft Grade D type sheathing paper complying with ICC-ES AC38.
 - 1. Water Vapor Permeance: 29 perms, minimum, when tested in accordance with ASTM E96/E96M using Procedure A - Desiccant Method, at 73.4 degrees F.
 - 2. Water Resistance: 60 minutes, minimum, when tested in accordance with ASTM D779.

2.03 AIR BARRIER MATERIALS (WATER VAPOR PERMEABLE AND WATER-RESISTIVE)

- A. Air Barrier Sheet, Mechanically Fastened:
 - 1. Air Permeance: 0.004 cubic feet per square foot, maximum, when tested in accordance with ASTM E2178.
 - 2. Water Vapor Permeance: 5 perms, minimum, when tested in accordance with ASTM E96/E96M Procedure A (desiccant method).
 - 3. Ultraviolet and Weathering Resistance: Approved in writing by manufacturer for minimum of 9 months weather exposure.
 - 4. Manufacturers:
 - a. DuPont Company; Tyvek CommercialWrap: www.dupont.com.

2.04 ACCESSORIES

- A. Flexible Flashing: Self-adhering sheet flashing complying with ASTM D1970/D1970M; waive slip resistance requirement if not installed on roof.
 - 1. Width: 6 inches.
 - 2. Ultraviolet (UV) and Weathering Resistance: Approved by manufacturer for up to 180 days of weather exposure.
 - 3. Products:
 - a. DuPont de Nemours, Inc; FlexWrap: www.dupont.com/building/#sle.
 - b. Henry, a Carlisle Company; FortiFlash: www.henry.com/#sle.
 - c. Henry, a Carlisle Company; FortiFlex Butyl: www.henry.com/#sle.
 - d. Henry, a Carlisle Company; FortiFlash Butyl: www.henry.com/#sle.

- e. Pecora Corporation; XL-Wrap TWF - Thru Wall Flashing, with XL-WraPrime Membrane Primer: www.pecora.com/#sle.
- f. W. R. Meadows, Inc; Air-Shield Butyl Flashing: www.wrmeadows.com/#sle.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces and conditions comply with requirements of this section.

3.02 PREPARATION

- A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.
- B. Clean and prime substrate surfaces to receive adhesives and sealants in accordance with manufacturer's installation instructions.

3.03 INSTALLATION

- A. Install materials in accordance with manufacturer's installation instructions.
- B. Install continuous water-resistive barriers where indicated on drawings, with sheets lapped to shed water.
- C. Mechanically Fastened Sheets:
 - 1. Install sheets in shingle fashion to shed water; align horizontally.
 - 2. Overlap seams as recommended by manufacturer, 6 inches, minimum.
 - 3. Overlap at outside and inside corners as recommended by manufacturer, 12 inches, minimum.
 - 4. Attach to framed construction with fasteners extending through sheathing into framing, and space fasteners at 12 to 18 inches on center along each framing member supporting sheathing.
 - 5. For applications indicated to be airtight, seal seams, laps, penetrations, tears, and cuts with self-adhesive tape; use only large-headed, gasketed fasteners as recommended by manufacturer.
 - 6. Install water-resistive barrier over jamb flashings.
 - 7. Install head flashings under water-resistive barrier.
 - 8. At framed openings with frames having nailing flanges, extend sheet into opening and over flanges; at head of opening, seal sheet over flange and flashing.
- D. Openings and Penetrations in Exterior Water-Resistive Barriers:
 - 1. Install flashing over sills, covering entire sill framing member, and extend at least 5 inches onto water-resistive barrier and at least 6 inches up jambs; mechanically fasten stretched edges.
 - 2. At openings filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches wide; do not seal sill flange.

3. At openings filled with nonflanged frames, seal water-resistive barrier to each side of framing at opening using flashing at least 9 inches wide, and covering entire depth of framing.
4. At head of openings, install flashing under water-resistive barrier extending at least 2 inches beyond face of jambs; seal water-resistive barrier to flashing.
5. At interior face of openings, seal gaps between window and door frames and rough framing using appropriate joint sealant over backer rod.
6. Service and Other Penetrations: Form flashing around penetrating items and seal to surface of water-resistive barrier.

3.04 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements for additional requirements.
- B. County's Inspection and Testing: Cooperate with County's testing agency.
 1. Allow access to work areas and staging.
 2. Notify County's testing agency in writing of schedule for work of this section to allow sufficient time for testing and inspection.
 3. Do not cover work of this section until testing and inspection is accepted.

3.05 PROTECTION

- A. Do not leave materials exposed to weather longer than recommended by manufacturer.
- B. Do not leave paper- or felt-based barriers exposed to weather for longer than one week.

END OF SECTION

Section 07 41 14
Preformed Metal Roof Panels

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. The work includes, but is not necessarily limited to, furnishing and installation of all preformed metal wall panels, and accessories as indicated on the drawings and specified herein.
- B. Architectural roofing system of preformed steel panels.
- C. Fastening system.
- D. Factory finishing.
- E. Accessories and miscellaneous components.

1.02 RELATED SECTIONS

- A. Section 06 10 00 - Rough Carpentry: Wall sheathing.
- B. Section 06 15 00 - Wood Decking: Roof sheathing.
- C. Section 07261 - Weather Resistant Membranes
- D. Section 07 90 05 - Joint Sealers: Field-installed sealants.

1.03 REFERENCES

- A. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2004a.
- B. ASTM A 792/A 792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2003.
- C. ASTM D 523-89(1999) Standard Test Method for Specular Gloss
- D. ASTM A 924-04 Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
- E. ASTM E 1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference; 2001.
- F. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies; 1994.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Summary of test results, indicating compliance with specified requirements.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
 - 4. Specimen warranty.
- C. Warranty: Submit specified manufacturer's warranty and ensure that forms have been completed in County's name and are registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in the manufacture of wall systems similar to those required for this project, with not less than 10 years of experience.
- B. Panel manufacturers without full supporting literature, Flashings & Details Guides, Guide Specifications and Technical Support shall not be considered equal to the specified product.
- C. Installer Qualifications: Installation of panels and accessories by installers with a minimum of 5 years experience on panel projects of this nature.

1.06 REGULATORY AGENCY REQUIREMENTS

- A. Comply with CBC and local Building Code requirements if more restrictive than those specified herein.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Provide strippable plastic protection on prefinished roofing panels for removal after installation.
- B. Store wall panels on project site as recommended by manufacturer to minimize damage to panels prior to installation.
 - 1. Protect against damage and discoloration
 - 2. Handle panels with non-marring slings.
 - 3. Do not bend panels.
 - 4. Store panels above ground, with one end elevated for drainage.
 - 5. Protect panels against standing water and condensation between adjacent surfaces.
 - 6. If panels become wet, immediately separate sheets, wipe dry with clean cloth, and allow to air dry.
 - 7. Remove any strippable film coating prior to installation and do not allow it to remain on the panels in extreme cold, heat or in direct sunlight.

1.08 WARRANTY

- A. Finish Warranty: Provide manufacturer's special warranty covering failure of factory-applied exterior finish on metal wall panels and agreeing to repair or replace panels that show evidence

of finish degradation, including significant fading, chalking, cracking, or peeling within specified warranty period of 10 year period from date of Substantial Completion.

- B. Waterproofing Warranty: Provide manufacturer's warranty for weathertightness of wall system, including agreement to repair or replace paneling that fails to keep out water within specified warranty period of 10 years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Design is based on Standing seam metal roof panels, manufactured by AEP Span.
 - 1. ASC Profiles Inc., 2110 Enterprise Boulevard, West Sacramento, California 95691-3493, 800-726-2727, 916-372-6851, Fax: 916-372-7606
 - 2. Fontana: 10905 Beech Avenue, Fontana, California 92337, 909-823-0401
- B. Acceptable manufacturers are:
 - 1. Architectural Building Components : www.archmetalroof.com.
 - 2. ATAS International, Inc : www.atas.com.
- C. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 PANELS

- A. Performance Requirements: Provide complete wall panel assemblies, including wall panels, clips, fasteners, connectors, and miscellaneous accessories, tested for conformance to the following minimum standards:
 - 1. Overall: Complete weathertight system tested and approved in accordance with ASTM E 1592.
 - 2. Wind Uplift: Class 90 wind uplift resistance of UL 580.
 - 3. Thermal Movement: Design system to accommodate without deformation anticipated thermal movement over ambient temperature range of 100 degrees F.
- B. Materials
 - 1. Painted Panels
 - a. Material: Steel conforming to ASTM A792 Zinalume®, minimum yield 40,000 psi, thickness 24 gauge .
 - b. Protective Coating: Conform to ASTM A792, AZ50 (Zinalume®)
 - c. Finish: DuraTech® 5000 exterior finish includes a 0.2 mil thick corrosion-resistant primer and a 0.8 mil thick finish coat of Polyvinylidene Fluoride (PVF2), full 70% Kynar 500®/Hylar 5000® for a total 1.0 mil dry film thickness with a specular gloss of 10-15% when tested in accordance with ASTM D-523-89 at 60o.
 - d. Colors: As selected by Architect from manufacturer's standard 24 colors
 - 2. Galvanized Panels
 - a. Material: Steel conforming to ASTM A653 (formerly ASTM A446), G-90 Galvanized, minimum yield 40,000 psi, thickness 24 gauge.
 - b. Protective Coating: Conform to ASTM A924 (formerly ASTM A525) G-90 Galvanized.
 - 3. Wall /Roof Panels: Factory-formed panels with factory-applied finish.

- a. Panel 5 (P5) : Flush Panel (flat pan)
 - 1) Profile: Standing seam, with minimum 1.0 inch seam height; concealed fastener system for field seaming with special tool.
 - 2) Profile: Concealed fastener raised flat panel
 - 3) Color: As identified on plans : DuraTech 5000.
 - 4) Length: Maximum possible length to minimize lapped joints.
 - 5) Depth: 7/8"
 - 6) Width: Maximum panel coverage of 12 inches.

2.03 ATTACHMENT SYSTEM

- A. Concealed System: Provide manufacturer's standard Zincalume or galvanized concealed fasteners and anchor clips designed for specific wall or soffit system and engineered to meet performance requirements, including anticipated thermal movement.
- B. Exposed System: Provide manufacturer's recommended Zincalume or galvanized fasteners engineered to meet performance requirements and equipped with appropriate sealant separators to provide weathertight connections that will accommodate anticipated thermal movement.

2.04 PANEL FINISH

- A. Fluoropolymer Coating System: Manufacturer's standard multi-coat thermocured coating system, including minimum 70 percent fluoropolymer color topcoat with minimum total dry film thickness of 0.9 mil; color and gloss to match sample.

2.05 ACCESSORIES AND MISCELLANEOUS ITEMS

- A. Rib Closures: Provide prefabricated, close-fitting components of closed-cell synthetic rubber, neoprene, or PVC as provided by the manufacturer.
- B. Sealants: As specified in Section 07 90 05.
 - 1. Exposed sealant must cure to rubber-like consistency.
 - 2. Concealed sealant must be non-hardening type.

2.06 FABRICATION

- A. Panels: Fabricate panels and accessory items at factory, using manufacturer's standard processes as required to achieve specified appearance and performance requirements.

2.07 ROOFING UNDERLAYMENT

- A. Provide Grace Ultra or approved equal at all locations of metal roofing.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Inspect installed work of other trades and verify that such work is complete to a point where this work may continue.
- B. Verify that installation may be made in accordance with approved shop drawings and manufacturer's instructions.
- C. Do not begin installation of preformed metal wall panels until substrates have been properly prepared. Notify Architect if work has been delayed due to incomplete preparation of the substrate.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 INSTALLATION

- A. Overall: Install wall system in accordance with approved shop drawings and panel manufacturer's instructions and recommendations, as applicable to specific project conditions. Anchor all components of wall system securely in place while allowing for thermal and structural movement.
 - 1. Install wall system with fasteners as recommended by manufacturer.
 - 2. Install wall system with exposed fasteners prefinished to match panels.
 - 3. Minimize field cutting of panels. Where field cutting is absolutely required, use methods that will not distort panel profiles. Use of torches for field cutting is absolutely prohibited. Where necessary to saw-cut panels, deburr cut edges.
- B. Accessories: Install all components required for a complete wall assembly, including flashings, trim, moldings, closure strips, caps, rib closures, and ridge closures.
- C. Remove protective film from surface of roof panels immediately prior to installation. Strip film carefully, to avoid damage to prefinished surfaces.
- D. Separate dissimilar metals by applying a bituminous coating, self-adhering rubberized asphalt sheet, or other permanent method approved by panel manufacturer.

3.03 CLEANING AND PROTECTION

- A. Clean exposed sheet metal work at completion of installation. Remove grease and oil films, excess joint sealer, handling marks, and debris from installation, leaving the work clean and unmarked, free from dents, creases, waves, scratch marks, or other damage to the finish.

3.04 PANEL DAMAGE AND FINISH SCRATCHES

- A. Do not apply touch-up paint to damaged paint areas that involve minor scratches.

- B. Panels or flashings that have severe paint and/or substrate damage shall be replaced as directed by the Architect's or Owner's representative.
- C. Replace damaged roof panels or accessories before date of Substantial Completion.

End of Section

**Section 07 46 46
Fiber-Cement Siding**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fiber-cement siding.

1.02 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Siding substrate.
- B. Section 07 25 00 - Weather Barriers: Water-resistive barrier under siding.
- C. Section 07 92 00 - Joint Sealants: Sealing joints between siding and adjacent construction and fixtures.

1.03 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- B. ASTM C1186 - Standard Specification for Flat Fiber Cement Sheets; 2008 (Reapproved 2012).

1.04 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. Installation methods, including nail patterns.
- C. Test Report: Applicable model code authority evaluation report (e.g. ICC-ES).
- D. Installer's qualification statement.
- E. Maintenance Instructions: Periodic inspection recommendations and maintenance procedures.
- F. Warranty: Submit copy of manufacturer's warranty, made out in County's name, showing that it has been registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of type specified in this section with not less than three years of experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. See Section 01 74 19 - 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 materials under dry and waterproof cover, well ventilated, and elevated above grade on a flat surface.

PART 2 PRODUCTS

2.01 FIBER-CEMENT SIDING

- A. Trim and Batten Boards: Trim pieces made of cement and cellulose fiber formed under high pressure with integral surface texture, complying with ASTM C1186 Type A Grade II.
 - 1. Texture: Smooth.
 - 2. Length (Height): 96 inches, nominal.
 - 3. Width: varies in inches.
 - 4. Thickness: 1/2 inch or greater, nominal.
 - 5. Finish: Smooth.
 - 6. Manufacturer: Same as siding manufacturer.
- B. Soffit Panels: Panels made of cement and cellulose fiber formed under high pressure with integral surface texture, complying with ASTM C1186, Type A, Grade II; with machined edges, for nail attachment.
 - 1. Texture: Smooth - vented.
 - 2. Length: 96 inches, nominal.
 - 3. Width: 12 inches.
 - 4. Thickness: 1/4 inch, nominal.
 - 5. Finish: Factory Integral Color.
 - 6. Color: As selected by Architect from manufacturers full range of available colors.
 - 7. Manufacturer: Same as siding.

2.02 ACCESSORIES

- A. Trim and Battens: Same material and texture as siding.
- B. Fasteners: Galvanized or corrosion resistant; length as required to penetrate, 1-1/4 inches, minimum.

- C. Exterior Soffit Vents: One piece, perforated, ASTM A653/A653M galvanized steel with G90 coating, with edge suitable for direct application to gypsum board and manufactured especially for soffit application, and provide continuous vent.
- D. Sealant: Elastomeric, polyurethane or silyl-terminated polyether/polyurethane, and capable of being painted.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrate, clean and repair as required to eliminate conditions that would be detrimental to proper installation.
- B. Do not begin until unacceptable conditions have been corrected.
- C. If substrate preparation is responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Protect surrounding areas and adjacent surfaces during execution of this work.
- B. Install Sheet Metal Flashing:
 - 1. Above door and window trim and casings.
 - 2. Above horizontal trim in field of siding.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions and recommendations.
 - 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 as indicated on drawings.
 - 4. Touch up field cut edges before installing.
 - 5. Pre-drill nail holes if necessary to prevent breakage.
- B. Over Wood and Wood-Composite Sheathing: Fasten siding through sheathing into studs.
- C. Over Masonry Walls: Install furring strips of adequate thickness to accept full length of nails and spaced at 16 inches on center; leave space at top and bottom open; top may be behind soffit; at bottom install insect screen over opening by wrapping a strip of screen over bottom ends of vertical furring strips.
- D. Allow space for thermal movement between both ends of siding panels that butt against trim; seal joint between panel and trim with specified sealant.
- E. Joints in Horizontal Siding: Avoid joints in lap siding except at corners; where joints are inevitable stagger joints between successive courses.

- F. Joints in Vertical Siding: Install Z-flashing in horizontal joints between successive courses of vertical siding.
- G. Do not install siding less than 6 inches from ground surface, or closer than 1 inch to roofs, patios, porches, and other surfaces where water may collect.
- H. Exterior Soffit Vents: Install in accordance with manufacturer's written instructions and at locations indicated on drawings; provide vent area as indicated on drawings.
- I. After installation, seal joints except lap joints of lap siding; seal around penetrations, and paint exposed cut edges.

3.04 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 S

Section 07 54 00
Thermoplastic Membrane Roofing

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Adhered system with thermoplastic roofing membrane.
- B. Insulation, flat and tapered.
- C. Deck sheathing.
- D. Flashings.
- E. Roofing stack boots and walkway pads.

1.02 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Wood sheathing and backing for edge strips.
- B. Section 07 62 00 - Sheet Metal Flashing and Trim: Counterflashings, reglets.
- C. Section 22 0000 - Plumbing: Roof drains

1.03 REFERENCE STANDARDS

- A. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2024.
- B. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 1998 (Reapproved 2010).
- C. ASTM D751 - Standard Test Methods for Coated Fabrics; 2006 (Reapproved 2011).
- D. ASTM D1004 - Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting; 2013.
- E. ASTM D1204 - Standard Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature; 2014.
- F. ASTM D2136 - Coated Fabrics - Low-Temperature Bend Test; 2002 (Reapproved 2012).
- G. ASTM D3045 - Standard Practice for Heat Aging of Plastics Without Load; 2010.
- H. ASTM D4434/D4434M - Standard Specification for Poly(Vinyl Chloride) Sheet Roofing; 2021.

- I. ASTM D5602/D5602M - Standard Test Method for Static Puncture Resistance of Roofing Membrane Specimens; 2011.
- J. ASTM D5635 - Standard Test Method for Dynamic Puncture Resistance of Roofing Membrane Specimens; 2011.
- K. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2024a.
- L. ASTM E1980 - Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces; 2011 (Reapproved 2019).
- M. ASTM G154 - Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials; 2016.
- N. CBC, Chapter 15 - Roof Assemblies and Rooftop Structures; 2019.
- O. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.
- P. UL (FRD) - Fire Resistance Directory; current edition.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week before starting work of this section.
 - 1. Review preparation and installation procedures and coordinating and scheduling required with related work.

1.05 SUBMITTALS

- A. Product Data: Provide data indicating membrane materials, flashing materials, surfacing, fasteners, and ESR reports.
- B. Shop Drawings: Indicate joint or termination detail conditions and conditions of interface with other materials.
- C. Manufacturer's Installation Instructions: Indicate membrane seaming precautions and perimeter conditions requiring special attention.
- D. Manufacturer's Field Reports: Indicate procedures followed, ambient temperatures, humidity, and supplementary instructions given.
- E. Manufacturer's qualification statement.
- F. Installer's qualification statement.
- G. Warranty Documentation:
 - 1. Submit manufacturer warranty and ensure that forms have been completed in County's name and registered with manufacturer.
 - 2. Submit installer's written verification that installation complies with warranty conditions for waterproof membrane.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of this section with at least three years of documented experience.
 - 1. With minimum three years documented experience.
- C. Roof assembly shall comply with CBC, Chapter 15

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original containers, dry and undamaged, with seals and labels intact, unless otherwise indicated.
- B. Store materials in weather protected environment, clear of ground and moisture.
- C. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.
- D. Protect foam insulation from direct exposure to sunlight.

1.08 FIELD CONDITIONS

- A. Do not apply roofing membrane during unsuitable weather.
- B. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- C. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.
- D. Schedule applications so that no partially completed sections of roof are left exposed at end of workday.

1.09 WARRANTY

- A. System Warranty: Provide manufacturer's system warranty agreeing to repair or replace roofing that leaks or is damaged due to wind or other natural causes including all accessories and labor.
 - 1. Warranty Term: 20 years.
 - a. Non-Prorated provide for No Dollar Limit (NDL)
 - 2. For repair and replacement include costs of both material and labor in warranty.
 - 3. Exceptions not Permitted:
 - a. Ponding water
 - b. Damage due to winds speeds less than 90 mph

- B. Installer Warranty: Provide separate two (2) year workmanship warranty. In the event any work related to roofing, flashing, or metal is found to be within the Installer warranty term, defective or otherwise not in accordance with the Contract Documents, the Installer shall repair that defect at no cost to the Owner. The Installer's warranty obligation shall run directly to the Owner, and a copy shall be sent to the manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Thermoplastic Polyvinyl Chloride (PVC) Membrane Roofing Materials:
1. Sika Corporation Roofing; Sarnafil PVC: usa.sarnafil.sika.com. - Basis of Design
 2. Carlisle Construction Materials Inc: Sure Flex FRS : www.carlislestec.com
 3. Soprema: Sentinel G200: [//soprema.us](http://soprema.us)
 4. Or equal.

2.02 ROOFING

- A. Thermoplastic Membrane Roofing: One ply membrane, fully adhered, over insulation.
- B. Roofing Assembly Requirements:
1. Solar Reflectance Index (SRI): 104 , minimum initial, calculated in accordance with ASTM E1980.
 - a. Three year aged solar reflectance index: 75
 - b. Field applied coating may not be used to achieve specified SRI.
 2. Roof Covering External Fire Resistance Classification: UL (FRD) Class A.
 3. Insulation Thermal Resistance (R-Value): 3 per inch, minimum; provide insulation of thickness required.
- C. Acceptable Insulation Types - Constant Thickness Application: Any of types specified.
1. Minimum 2 layers of polyisocyanurate board.
 2. Bottom layer of polyisocyanurate board covered with single layer of polyisocyanurate board.
- D. Acceptable Insulation Types - Tapered Application: Any of types specified.
1. Tapered polyisocyanurate board.
 2. Tapered polyisocyanurate board covered with uniform thickness polyisocyanurate board.
 3. Uniform thickness polyisocyanurate board covered with tapered polyisocyanurate board.

2.03 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

- A. Basis of Design: Sarnafil G410 fiberglass reinforced membrane with a lacquer coating. ESR 1157
- B. Location: All low slope roofs
- C. Membrane shall conform to ASTM D4434/D4434M Classification: Type II.
- D. Color Membrane: White

- E. Backing: Feltback
- F. Typical Physical Properties
 - 1. Reinforcing Material: Fiberglass
 - 2. Overall Thickness, min., inches (mm): 80 mil. per ASTM D751.
 - 3. Tensile Strength, min lbf (N): 110 (489) per ASTM D751
 - 4. Elongation at Break, (machine x transverse): 250%/220% per ASTM D751
 - 5. Seam strength*, min. (% of tensile strength): 75 per ASTM D751
 - 6. Retention of Properties After Heat Aging: per ASTM D3045
 - a. Tensile Strength, min., (% of original): 90 per ASTM D751
 - b. Elongation, min., (% of original): 90 per ASTM D751
 - 7. Tearing Resistance, min lbf (N): 22 per ASTM D1004
 - 8. Low Temperature Bend, -40°F (-40°C): Pass per ASTM D2136
 - 9. Accelerated Weathering Test (UV exposure): 10,000 Hours per ASTM G154
 - a. Cracking (7x magnification): None
 - b. Discoloration (by observation): Negligible
 - c. Crazing (7 x magnification): None
 - 10. Linear Dimensional Change: 0.02% per ASTM D1204
 - 11. Weight Change After Immersion in Water: 1.7% per ASTM D570
 - 12. Static Puncture Resistance, 33 lbf (15 kg): Pass per ASTM D5602/D5602M
 - 13. Dynamic Puncture Resistance, 7.3 ft-lbf (10 J): Pass per ASTM D5635

2.04 FLASHING MATERIAL AND ACCESSORIES

- A. Flashing Material - Note: All Flashing touching thermoplastic roof system is to be provided as part of this specification by the roofing contractor.
 - 1. Wall/Curb Flashing
 - a. Membrane
 - 1) A fiberglass reinforced membrane adhered to approved substrate using adhesive. Consult manufacturer for adhesive options and additional information.
 - 2) Thickness: 60 mil per ASTM D751 at vertical applications only not subject to foot traffic, otherwise thickness as specified above.
 - b. PVC-Coated Flashing
 - 1) A PVC-coated, heat-weldable sheet metal capable of being formed into a variety of shapes and profiles. Flashing is a minimum 24-gauge, G90 galvanized metal sheet with a 20 mil (1 mm) unsupported membrane laminated on one side.
 - 2. Perimeter Edge Flashing
 - a. PVC-Coated Flashing
 - 1) A PVC-coated, heat-weldable sheet metal capable of being formed into a variety of shapes and profiles. Flashing is a minimum 24-gauge, G90 galvanized metal sheet with a 20 mil (1 mm) unsupported membrane laminated on one side.
 - 3. Miscellaneous Flashing
 - a. Reglet
 - 1) A heavy-duty, extruded aluminum flashing termination reglet used at walls and large curbs. Reglet is produced from 6063-T5, 0.10 inch - 0.12-inch (2.5 mm - 3.0 mm) thick extruded aluminum. Reglet to have a 2¼-inch (57 mm) deep profile, and provided in 10-foot (3 m) lengths. Use prefabricated reglet mitered inside and outside corners where walls intersect.

- b. Pipe Flashing
 - 1) A prefabricated vent pipe flashing made from 0.048-inch (48 mil/1.2 mm) thick membrane. Available in four (4) different sizes.
- c. Corners
 - 1) Prefabricated outside and inside flashing corners made of 0.060-inch (60 mil/1.5 mm) thick membrane that is heat-welded to membrane or clad base flashings.
- d. Multi-Purpose Sealant
 - 1) Use sealant as recommended by membrane manufacturer

B. MEMBRANE ADHESIVE

- 1. Water-based Adhesive: A water-based adhesive used to attach the membrane to the horizontal or near-horizontal substrate.
 - a. As recommended by membrane manufacturer
 - b. Application Rate for Dens-Deck Prime are as follows:
 - 1) Substrate Rate - gallons/100 ft : 1.50
 - 2) Membrane Rate - gallons/100ft: 0
 - 3) Total Rate - gallons/100ft: 1.50
 - c. There is a significant increase in drying time due to an increase in humidity and/or a decrease in temperature. Do not install when outdoor or substrate temperatures during drying period are expected to fall below 40°F.
 - d. Do not allow 2121 adhesive to skin-over or surface-dry prior to installation of membrane.
 - e. Use a water-filled, foam-covered lawn roller to consistently and evenly press the membrane into the adhesive layer.

C. FASTENERS and ASSOCIATED COMPONENTS

- 1. Plate: Used with various Fasteners to attach insulation boards to roof deck. Plate is a 3 inch square or round, 26 gauge stamping of SAE 1010 steel with an AZ 55 Galvalume coating.
- 2. Fastener #12: A #12 corrosion-resistant fastener used with Plates to attach insulation boards to steel or wood roof decks. Fastener #12 has a modified buttress thread, a shank diameter of approximately 0.168 inch and a thread diameter of approximately 0.214 inch (5 mm). The driving head has a diameter of approximately 0.435 inch with a #3 Phillips recess for positive engagement.
- 3. Fastener-XP: A #15, heavy-duty, corrosion-resistant fastener used with Plate to attach insulation or Stop and Bar to attach G410 roof membrane to steel or wood roof decks. Fastener-XP has a shank diameter of approximately 0.21 inch and the thread diameter is approximately 0.26 inch. The driving head has a diameter of approximately 0.435 inch with a #3 Phillips recess for positive engagement.
- 4. Stop: An extruded aluminum, low profile bar used with certain Fasteners to attach to the roof deck or to walls/curbs at terminations, penetrations and at incline changes of the substrate. Stop is a 1 inch wide, flat aluminum bar 1/8 inch thick that has predrilled holes every 6 inches on center.
- 5. Bar: An FM-approved, heavy-duty, 14 gauge, galvanized or stainless, roll-formed steel bar used to attach membrane to roof decks. The formed steel is pre-punched with holes every 1 inch on center to allow various Fastener spacing options.

D. MISCELLANEOUS RELATED MATERIALS

- 1. Aluminum Tape

- a. A 2-inch (50 mm) wide pressure-sensitive aluminum tape used as a separation layer between small areas of asphalt contamination and the membrane and as a bond-breaker under the coverstrip at clad joints. As recommended by membrane manufacturer.
 2. Sealing Tape Strip
 - a. Compressible foam with pressure-sensitive adhesive on one side. Used with metal flashings as a preventive measure against air and wind blown moisture entry. As recommended by membrane manufacturer.
 3. Multi-Purpose Tape
 - a. A high performance sealant tape with used with metal flashings as a preventive measure against air and wind blown moisture entry. As recommended by membrane manufacturer.
 4. Solvent
 - a. A high quality solvent cleaner used for the general cleaning of residual asphalt, scuff marks, etc., from the membrane surface. Solvent is also used daily to clean seam areas prior to hot-air welding in tear off or dirty conditions or if the membrane is not welded the same day it is unrolled. As recommended by membrane manufacturer.
- E. MISCELLANEOUS FASTENERS AND ANCHORS
 1. All fasteners, anchors, nails, straps, bars, etc. shall be post-galvanized steel, aluminum or stainless steel. Mixing metal types and methods of contact shall be assembled in such a manner as to avoid galvanic corrosion. Fasteners for attachment of metal to masonry shall be expansion type fasteners with stainless steel pins. All concrete fasteners and anchors shall have a minimum embedment of 1¼ inch (32 mm) and shall be approved for such use by the fastener manufacturer. All miscellaneous wood fasteners and anchors used for flashings shall have a minimum embedment of 1 inch (25 mm) and shall be approved for such use by the fastener manufacturer.

2.05 DECK SHEATHING

- A. Deck Sheathing: Glass mat faced gypsum panels, ASTM C1177/C1177M, fire resistant type, 1/4 inch thick over insulation, 1/2" thick at inside face of parapet.
 1. Products:
 - a. Georgia-Pacific; DensDeck Prime: www.densdeck.com/#sle.
 - b. National Gypsum Company; DEXcell Glass Mat Roof Board: www.nationalgypsum.com/#sle.

2.06 ACCESSORIES

- A. Walkway Matting: open grid, self draining, non-porous roof walkway matting system
 1. Product Crossgrip PVC: Plastex USA: www.plastexmatting.com
 2. loose-lay, slip resistant, self-draining
 3. Wind resistant to 60 mph, stable to 94 mph

PART 3 EXECUTION

3.01 INSPECTION

- A. Inspect the roof areas and conditions under which work of this Section will be installed. Correct conditions detrimental to the proper and timely completion of the work. Inspect roof drain and outlets to insure proper elevation to permit free flow of water into such drain and prevent water dams at rim. Do not proceed until detrimental conditions have been corrected.

3.02 SURFACE CONDITIONS AND SUBSTRATE PREPARATION

- A. The Roofing Subcontractor shall comply with all reasonably applicable requirements of the Owner's safety and security requirements and with all applicable Federal, State, Local and City regulations, laws, and ordinances.
- B. The Roofing Subcontractor shall provide coverings to protect building and ground surfaces in all areas in which work is being performed and the surfaces to be protected in that location. Protection requirements shall include those surfaces over or past which materials, including pumped adhesives, are being transported.
- C. The surface of the deck must be broom clean, dry, properly secured and free of defects.
- D. Other Conditions: Contractor shall verify that the concrete roof substrata are smooth, dry, clean and free from sharp projections, properly graded to roof outlets and that all metal fittings are in place prior to start of installation of insulation and roofing.

3.03 ENVIRONMENTAL REQUIREMENTS

- A. Application of roofing materials shall not be performed when weather conditions interfere with good application practices. Materials shall not be stored or applied on damp surfaces or in the presence of rain or snow.
- B. Installed materials shall be protected from repetitive traffic with plywood or other rigid materials. Unfinished perimeters of the roof system shall be sealed with temporary water cutoffs. Materials used in constructing temporary cutoffs shall be removed before the application of finished assemblies.
- C. Roofing may be installed under certain adverse weather conditions such as extremes of high and low temperatures or high humidity conditions, but only after consulting the Manufacturer since special precautions may have to be applied.
- D. Only as much new roofing as can be made watertight each day shall be installed each day. This includes all flashing work.
- E. Precautions shall be taken to prevent wind blow-off or wind damage during the course of the roofing application. This may necessitate additional attachment of temporary construction.
- F. Temporary water stops shall be installed at the end of each workday. These temporary water stops shall be removed at the start of the next workday and disposed of properly.

- G. Do not install the roofing membrane in direct contact with any products containing asphalt, coal tar pitch, creosote, or other harmful materials.
- H. All work shall be scheduled and executed without exposing interior building areas to the effects of inclement weather. The building and its contents shall be protected against all reasonable risks. Arrange work sequences to avoid use of newly roofed areas for storage, walking surfaces and equipment movement. Contractor shall provide all necessary protection and barriers to segregate the work areas and prevent damage to adjacent areas. If excessive foot traffic over newly installed membrane is necessary, contractor shall provide plywood or felt protection to prevent damage.

3.04 INSTALLATION MEMBRANE

- A. Inspect the surface of the protection board prior to installation of the new roof membrane. The substrate shall be clean, dry, free from debris and smooth with no surface roughness or contamination. Broken, delaminated, wet or damaged boards shall be removed and replaced.
- B. In re-roof applications where previous roof system was asphalt based insure that in no instance shall the new membrane come into direct contact with residual asphalt.

3.05 HOT-AIR WELDING OF SEAM OVERLAPS

- A. General
 - 1. All seams shall be hot air welded. Seam overlaps should be as per manufacturer recommendation for the specified system and warranty.
 - 2. Welding equipment shall be provided by or approved by membrane manufacturer. All mechanics intending to use the equipment shall have successfully completed a training course provided by a manufacturer's technical representative prior to welding.
 - 3. All membrane to be welded shall be clean and dry.
- B. Hand-Welding
 - 1. Hand-welded seams shall be completed in two stages as recommended by membrane manufacturer.
- C. Machine Welding
 - 1. Machine welded seams are to be achieved by the use of membrane manufacturer's recommended automatic welding equipment. When using this equipment, manufacturer's instructions shall be followed and local codes for electric supply, grounding and over current protection observed.
- D. Quality Control of Welded Seams
 - 1. The Applicator shall check all welded seams for continuity using a rounded screwdriver. On-site evaluation of welded seams shall be made daily by the Applicator to locations as directed by the Owner's Representative or membrane manufacturer's representative. One-inch (25 mm) wide cross-section samples of welded seams shall be taken at least three times a day. Correct welds display failure from shearing of the membrane prior to separation of the weld. Each test cut shall be patched by the Applicator at no extra cost to the Owner.

3.06 MEMBRANE FLASHINGS

- A. All flashings shall be installed concurrently with the roof membrane as the job progresses. No temporary flashings shall be allowed without the prior written approval of the Owner's Representative and membrane manufacturer. Approval shall only be for specific locations on specific dates. If any water is allowed to enter under the newly completed roofing, the affected area shall be removed and replaced at the Applicator's expense. Flashing shall be adhered to compatible, dry, smooth, and solvent-resistant surfaces. Use caution to ensure adhesive fumes are not drawn into the building.
- B. Adhesive for Membrane Flashings
 - 1. Over the properly installed and prepared flashing substrate, Adhesive shall be applied according to instructions found on the Product Data Sheet. The adhesive shall be applied in smooth, even coats with no gaps, globs or similar inconsistencies. Only an area, which can be completely covered in the same day's operations, shall be flashed. The bonded sheet shall be pressed firmly in place with a hand roller.
 - 2. No adhesive shall be applied in seam areas that are to be welded. All panels of membrane shall be applied in the same manner, overlapping the edges of the panels as required by welding techniques.
- C. Install stop or bar according to the Detail Drawings with approved fasteners into the structural deck at the base of parapets, walls and curbs. Stops or bars may be required at the base of all tapered edge strips and at transitions, peaks, and valleys according to manufacturer's details. Manufacturer's requirements and recommendations and the specifications shall be followed. All material submittals shall have been accepted by manufacturer prior to installation.
- D. All flashings shall extend a minimum of 8 inches (0.2 m) above roofing level unless otherwise accepted in writing by the Owner's Representative and membrane manufacturer.
- E. All flashing membranes shall be consistently adhered to substrates. All interior and exterior corners and miters shall be cut and hot air welded into place. No bitumen shall be in contact with the membrane.
- F. All flashing membranes shall be mechanically fastened along the counter-flashed top edge at 6-8 inches (0.15-0.20 m) on center.
- G. Flashings shall be terminated according to manufacturer recommended details.
- H. All adhered flashings that exceed 30 inches (0.75 m) in height or that of the perimeter bar spacings shall receive additional securement as per manufacturer.
- I. All mechanically attached flashings that exceed 18 inches (0.46 m) in height shall receive additional securement as per manufacturer.

3.07 METAL FLASHINGS

- A. Metal details, fabrication practices and installation methods shall conform to the applicable requirements of the following:
 - 1. Factory Mutual Loss Prevention Data Sheet 1-49 (latest issue).

- 2. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - latest issue.
- B. Complete all metal work in conjunction with roofing and flashings so that a watertight condition exists daily.
- C. Metal shall be installed to provide adequate resistance to bending to allow for normal thermal expansion and contraction.
- D. Metal joints shall be watertight.
- E. Metal flashings shall be securely fastened into solid wood blocking. Fasteners shall penetrate the wood nailer a minimum of 1 inch (25 mm).
- F. Counter flashings shall overlap base flashings at least 4 inches (100 mm).

3.08 METAL BASE FLASHINGS/EDGE METAL

- A. All flashings shall be installed concurrently with the roof membrane as the job progresses. No temporary flashings shall be allowed without the prior written approval of the Owner's Representative and membrane manufacturer. Acceptance shall only be for specific locations on specific dates. If any water is allowed to enter under the newly completed roofing due to incomplete flashings, the affected area shall be removed and replaced at the Applicator's expense.
- B. Clad metal flashings shall be formed and installed per the Detail Drawings.
 - 1. All metal flashings shall be fastened into solid wood nailers with two rows of post galvanized flat head annular ring nails, 4 inches (100 mm) on center staggered. Fasteners shall penetrate the nailer a minimum of 1 inch (25 mm).
 - 2. Metal shall be installed to provide adequate resistance to bending and allow for normal thermal expansion and contraction.
- C. Adjacent sheets of clad flashings shall be spaced ¼ inch (6 mm) apart. The joint shall be covered with 2-inch (50 mm) wide aluminum tape. A 4-inch minimum (100 mm) wide strip of flashing membrane shall be hot air welded over the joint.

3.09 WALKWAY INSTALLATION

- A. Install walkway loose laid on completed roof assembly. Do not install walkway directly over bars. Check all existing deck membrane seams that are to be covered and re-weld any inconsistencies before installation.

END OF SECTION

Section 07 62 00
Sheet Metal Flashing and Trim

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fabricated sheet metal items, including flashings, counterflashings, and exterior penetrations.
- B. Sealants for joints within sheet metal fabrications.

1.02 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Wood nailers for sheet metal work.
- B. Section 07 4114 - Preformed Metal Roof Panels
- C. Section 07 71 23 - Manufactured Gutters and Downspouts.
- D. Section 08 1100 (08110) - Steel Doors and Frames
- E. Section 08 4313 - Metal Framed Storefronts

1.03 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- B. ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).
- C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.
- D. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2018).
- E. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

1.05 QUALITY ASSURANCE

- A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.
- B. Maintain one copy of each document on site.
- C. Fabricator and Installer Qualifications: Company specializing in sheet metal work with five (5) years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- B. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

- A. Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24-gauge, 0.0239-inch thick base metal.
- B. Note: Flashing directly contacting the thermoplastic roof membrane is to be flashed with clad metal by the roofing manufacture.

2.02 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest possible lengths.
- C. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- D. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- E. Fabricate corners from one piece with minimum 18-inch long legs; seam for rigidity, seal with sealant.
- F. Fabricate vertical faces with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.
- G. Fabricate flashings to allow toe to extend 2 inches over roofing . Return and brake edges.

2.03 ACCESSORIES

- A. Concealed Sealants: Non-curing butyl sealant.

- B. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.
- C. Asphalt Roof Cement: ASTM D4586/D4586M, Type I, asbestos-free.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- B. Verify roofing termination and base flashings are in place, sealed, and secure.
- C. In the event of a discrepancy, immediately notify the Architect.

3.02 PREPARATION

- A. Install starter and edge strips, and cleats before starting installation.
- B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil, 0.015 inch.

3.03 INSTALLATION

- A. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted..
- B. Apply plastic cement compound between metal flashings and felt flashings.
- C. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- D. Secure gutters and downspouts in place with concealed fasteners.

3.04 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements for field inspection requirements.

End of Section

Section 07 71 23
Manufactured Gutters and Downspouts

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Galvanized steel gutters and downspouts.
- B. Precast concrete splash pads.

1.02 RELATED REQUIREMENTS

- A. Section 07 3113 - Sloped roofing system.
- B. Section 07 62 00 - Sheet Metal Flashing and Trim.
- C. Section 09 91 13 - Exterior Painting: Field painting of metal surfaces.
- D. Section 07 5400 - Thermoplastic Membrane Roofing

1.03 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- B. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Comply with SMACNA (ASMM) for sizing components for rainfall intensity determined by a storm occurrence of 1 in 5 years.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.
- C. Samples: Submit 6 samples, 12 inch long, illustrating component design, finish, color, and configuration.
 - 1. Samples are to be used by painting contractor to provide samples of special finishing copper paint.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Stack material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope to drain.
- B. Prevent contact with materials that could cause discoloration, staining, or damage.

1.07 PROJECT CONDITIONS

- A. Coordinate the work with downspout discharge pipe inlet.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Galvanized Steel Sheet: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 0.02 inch thick base metal.

2.02 COMPONENTS

- A. Gutters:
 - 1.
 - 2. Half Round
- B. Downspouts: Profile as indicated and to match existing.
- C. Anchors and Supports: Profiled to suit gutters and downspouts.
 - 1. To match existing
 - 2. Anchoring Devices: In accordance with SMACNA requirements.
 - 3. Gutter Supports: Brackets.
 - 4. Downspout Supports: Brackets.

2.03 ACCESSORIES

- A. Splash Pans: Same metal type as downspouts, formed to ____ by ____ inches size; rolled sides ____ inch high for inverted pan placement.
- B. Splash Pads: Precast concrete type, profiles size(s) as indicated; minimum 3,000 psi compressive strength at 28 days, with minimum 5 percent air entrainment.
- C. Strainer Guard: Install "beehive"-type strainer-guard at downspouts, removable for cleaning.

2.04 SPECIAL FINISHING

- A. Gutters and Downspouts and all attachment accessories are to be finished with special copper paint prior to installation. Gutter and downspout manufacturer are required to coordinate with painting contractor to provide an acceptable final finish. Refer to specification section 09 9000 - Painting and Coating

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that surfaces are ready to receive work.

3.02 PREPARATION

- A. Paint concealed sheet metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to a minimum dry film thickness of 15 mil, 0.015 inch.

3.03 INSTALLATION

- A. Install gutters, downspouts, and accessories in accordance with manufacturer's instructions.
- B. Sheet Metal: Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts and accessories.
- C. Slope gutters 1/16 inch per foot , ____ percent minimum.
- D. Solder metal joints for full metal surface contact. After soldering, wash metal clean with neutralizing solution and rinse with water.

END OF SECTION

**Section 07 72 00
Roof Accessories**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Roof hatches, manual and automatic operation, including smoke vents.

1.02 RELATED REQUIREMENTS

- A. Section 05500 - Metal Fabrications: Roof access ladders
- B. Section 07212 - Board and Batt Insulation
- C. Section 07 5400 - Thermoplastic Membrane

1.03 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used.
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
 - 4. Maintenance requirements.
- C. Warranty Documentation:
 - 1. Submit manufacturer warranty.
 - 2. Ensure that forms have been completed in County's name and registered with manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store products under cover and elevated above grade.

1.06 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

- B. Extended Correction Period: Correct defective work within 5-year period commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.01 ROOF HATCHES AND VENTS, MANUAL AND AUTOMATIC OPERATION

- A. Roof Hatch Manufacturers:
 - 1. Bilco Company; Type TB (various types and special size): www.bilco.com/#sle.
 - 2. O'Keeffe's
 - 3. Milcor, Inc: www.milcorinc.com.
- B. Roof Hatches and Smoke Vents: Factory-assembled aluminum frame and cover, complete with operating and release hardware.
 - 1. Style: Provide flat metal covers unless otherwise indicated.
 - 2. Mounting: Provide frames and curbs suitable for mounting conditions as indicated on drawings.
 - 3. Thermally Broken Hatches: Provide insulation within frame and cover.
 - 4. For Ladder Access: Single leaf; 30 by 36 inches.
- C. Metal Covers: Flush, insulated, hollow metal construction.
 - 1. Capable of supporting 40 psf live load.
 - 2. Insulation: Manufacturer's standard 3 inch rigid polyisocyanurate.
 - 3. Gasket: Neoprene, continuous around cover perimeter.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using methods recommended by manufacturer for achieving acceptable results for applicable substrate under project conditions.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions, in manner that maintains roofing system weather-tight integrity.

3.04 PROTECTION

- A. Clean installed work to like-new condition.
- B. Protect installed products until completion of project.
- C. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

Section 07 90 05

Joint Sealers

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sealants and joint backing.

1.02 REFERENCE STANDARDS

- A. ASTM C834 - Standard Specification for Latex Sealants; 2014.
- B. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2012.
- C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.
- D. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.
- E. ASTM D1056 - Standard Specification for Flexible Cellular Materials--Sponge or Expanded Rubber; 2014.
- F. ASTM D1667 - Standard Specification for Flexible Cellular Materials--Poly(Vinyl Chloride) Foam (Closed-Cell); 2005 (Reapproved 2011).

1.03 SUBMITTALS

- A. See Section , for submittal procedures.
- B. Product Data: Provide data indicating sealant .
- C. LEED Report: Submit VOC content documentation for all non-preformed sealants and primers.
- D. Manufacturer's Installation Instructions: Indicate .

1.04 QUALITY ASSURANCE

- A. Work to be performed by workers thoroughly trained and familiar with the requirements of joint sealers.

1.05 MOCK-UP

- A. Provide mock-up of sealant joints in conjunction with under provisions of Section .
- B. Construct mock-up with specified sealant types and with other components noted.

- C. Locate .
- D. Mock-up remain as part of the Work.

1.06 FIELD CONDITIONS

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

1.07 WARRANTY

- A. See Section , for additional warranty requirements.
- B. Correct defective work within a year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories which fail to achieve , exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Polysulfide Sealants:
- B. Acrylic Emulsion Latex Sealants:

2.02 SEALANTS

- A. Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.
- B. Type 1 - General Purpose Exterior Sealant: Polyurethane; ASTM C920, Grade NS, Class 25 minimum; Uses M, G, and A; single component.
 - 1. Color:
 - 2. Applications: Use for:
 - a. Control, expansion, and soft joints in masonry.
 - b. Joints between concrete and other materials.
 - c. Joints between metal frames and other materials.
 - d. Other exterior joints for which no other sealant is indicated.
- C. Exterior Metal Lap Joint Sealant: Butyl or polyisobutylene, nondrying, nonskinning, noncuring.
 - 1. Applications: Use for:
 - a. Concealed sealant bead in sheet metal work.
 - b. Concealed sealant bead in siding overlaps.
- D. General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, Type OP, Grade NF single component, paintable.
 - 1. Color:

2. Applications: Use for:
 - a. Interior wall and ceiling control joints.
 - b. Joints between door and window frames and wall surfaces.
 - c. Other interior joints for which no other type of sealant is indicated.
- E. Bathtub/Tile Sealant: White silicone; ASTM C920, Uses M and A; single component, mildew resistant.
 1. Applications: Use for:
 - a. Joints between plumbing fixtures and floor and wall surfaces.
 - b. Joints between kitchen and bath countertops and wall surfaces.
- F. Acoustical Sealant for Concealed Locations:
 1. Applications: Use for concealed locations only:
 - a. Sealant bead between top stud runner and structure and between bottom stud track and floor.
- G. Interior Floor Joint Sealant: Polyurethane, self-leveling; ASTM C920, Grade P, Class 25, Uses T, M and A; component.
 1. Applications: Use for:
 - a. Expansion joints in floors.
- H. Sealant for Continuous Water Immersion: ; ASTM C920, Grade NS, Class 25, Uses I, M, and A; approved by manufacturer for continuous water immersion; component.
 1. Color:
 2. Applications: Use for:
- I. Concrete Paving Joint Sealant: Polyurethane, self-leveling; ASTM C920, Class 25, Uses T, I, M and A; component.
 1. Color:
 2. Applications: Use for:
 - a. Joints in sidewalks and vehicular paving.

2.03 ACCESSORIES

- A. Primer: Non-staining type, to suit application.
- B. Joint Backing: Round foam rod compatible with sealant; ; oversized to percent larger than joint width.
- C. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Protect elements surrounding the work of this section from damage or disfigurement.

3.03 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Perform acoustical sealant application work in accordance with ASTM C919.
- D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer.
- E. Install bond breaker where joint backing is not used.
- F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- G. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- H. Tool joints .

3.04 CLEANING

- A. Clean adjacent soiled surfaces.

3.05 PROTECTION

- A. Protect sealants until cured.

End of Section

**Section 08 11 13
Hollow Metal Doors and Frames**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Non-fire-rated hollow metal doors and frames.
- B. Hollow metal frames for wood doors.
- C. Fire-rated hollow metal doors and frames.
- D. Accessories, including glazing, louvers, and matching panels.

1.02 RELATED REQUIREMENTS

- A. Section 08 1416 - Flush Wood Doors
- B. Section 08 71 00 - Door Hardware.
- C. Section 08 80 00 - Glazing: Glass for doors and borrowed lites.
- D. Section 09 91 13 - Exterior Painting: Field painting.
- E. Section 09 91 23 - Interior Painting: Field painting.

1.03 ABBREVIATIONS AND ACRONYMS

- A. ANSI: American National Standards Institute.
- B. ASTM - American Society for Testing Materials.
- C. NFPA: National Fire Protection Association.
- D. SDI: Steel Door Institute.
- E. UL: Underwriters Laboratories.

1.04 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2014.

- C. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- E. 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; 2015.
- F. 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; 2025.
- G. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.
- H. ASTM E413 - Classification for Rating Sound Insulation; 2010.
- I. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2014.
- J. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2009.
- K. ITS (DIR) - Directory of Listed Products; current edition.
- L. NAAMM HMMA 810 - Hollow Metal Doors
- M. NAAMM HMMA 820 - Hollow Metal Frames
- N. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.
- O. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; 2007.
- P. NAAMM HMMA 850 - Fire-Protection and Smoke Control Rated Hollow Metal Door and Frame Products; 2014.
- Q. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2006.
- R. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.
- S. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.
- T. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2013.
- U. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

- V. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.
- C. Shop Drawings: Details of each opening and each different wall opening condition, showing elevations, glazing, anchorage, frame profiles, and any indicated finish requirements.
- D. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.
- E. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.
- F. Manufacturer's Qualification Statement.
- G. Installer's Qualification Statement.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.
- C. Maintain at project site copies of reference standards relating to installation of products specified.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Hollow Metal Doors and Frames:
 - 1. Stiles Door, an Assa Abloy Group company; _____: www.assaabloydss.com/#sle.
 - 2. De La Fontaine Inc: www.delafontaine.com/#sle.

3. Republic Doors, an Allegion brand; ____: www.republicdoor.com/#sle.
4. Ceco Door Products; Product ____: www.cecodoor.com.
5. Steelcraft, an Allegion brand; ____: www.allegion.com/#sle.
6. Substitutions: See Section 01 61 00 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

- A. Requirements for Hollow Metal Doors and Frames:
 1. Steel Sheet: Comply with one or more of the following requirements; galvanized steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
 2. Accessibility: Comply with ICC A117.1 and ADA Standards.
 3. Exterior Door Top Closures: Flush end closure channel, with top and door faces aligned.
- B. Hollow Metal Panels: Same construction, performance, and finish as doors.
- C. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 HOLLOW METAL DOORS

- A. Type AA ,Interior Doors, Non-Fire Rated:
 1. Door Thickness: 1-3/4 inches, nominal.
- B. Type BB ,Fire-Rated Doors:
 1. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
 - a. Provide units listed and labeled by UL (DIR) or ITS (DIR).
 - b. Attach fire rating label to each fire rated unit.
 2. Door Thickness: 1-3/4 inches, nominal.

2.04 HOLLOW METAL FRAMES

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. Exterior Door Frames: Fully welded. Steelcraft F and FN series
 1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvanized) in accordance with ASTM A653/A653M, with A40/ZF120 coating.
 2. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.
- C. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
- D. Door Frames, Fire-Rated: Full profile/continuously welded type.
 1. Fire Rating: Same as door, labeled.

- E. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on drawings.

2.05 FINISHES

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 PREPARATION

- A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.03 INSTALLATION

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
- B. Install fire rated units in accordance with NFPA 80.
- C. Coordinate frame anchor placement with wall construction.
- D. Install door hardware as specified in Section 08 71 00.
- E. Comply with glazing installation requirements of Section 08 80 00.

3.04 TOLERANCES

- A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.
- B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.05 ADJUSTING

- A. Adjust for smooth and balanced door movement.

3.06 SCHEDULE

- A. Refer to Door and Frame Schedule on the drawings.

END OF SECTION

Section 08 14 16
Flush Wood Doors

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Flush wood doors; flush and flush glazed configuration; fire-rated, non-rated, and acoustical.

1.02 RELATED REQUIREMENTS

- A. Section 08 11 13 - Hollow Metal Doors and Frames.
- B. Section 08 71 00 - Door Hardware.
- C. Section 08 80 00 - Glazing.

1.03 REFERENCE STANDARDS

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).
- B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.
- C. NAAWS - North American Architectural Woodwork Standards, latest edition.
- D. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
 - 1. Provide information as required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).
- D. Samples: Submit two samples of door construction, 6 by 12 inch in size cut from top corner of door.
- E. Certificate: Submit labels and certificates required by quality assurance and quality control programs.

- F. Manufacturer's Installation Instructions: Indicate special installation instructions.
- G. Warranty, executed in County's name.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than three years of documented experience.
 - 1. Company with at least one project within past five years with value of woodwork within at least 20 percent of cost of woodwork for this project.
- B. Woodwork Quality Assurance Program:
 - 1. Provide labels indicating that the installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
 - 2. Provide designated labels on shop drawings as required by quality assurance program.
 - 3. Provide designated labels on installed products as required by quality assurance program.
 - 4. Submit documentation upon completion of installation that verifies this work is in compliance with specified requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Package, deliver and store doors in accordance with specified quality standard.
- B. Accept doors on site in manufacturer's packaging, and inspect for damage.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic; do not store in damp or wet areas or areas where sunlight might bleach veneer; seal top and bottom edges with tinted sealer if stored more than one week, and break seal on site to permit ventilation.

1.07 PROJECT CONDITIONS

- A. Coordinate the work with door opening construction, door frame and door hardware installation.

1.08 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Interior Doors: Provide manufacturer's warranty for the life of the installation.
- C. Provide warranty for the following term:
 - 1. Interior Doors: Life of installation.
- D. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Wood Veneer Faced Doors:
 - 1. Western Oregon Door: www.oregondoor.com
 - 2. Substitutions: See Section 01 61 00 - Product Requirements.

2.02 DOORS

- A. Doors: See drawings for locations and additional requirements.
 - 1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
 - 2. Quality Level: Custom Grade, in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Section 1300.
- B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
 - 1. Provide solid core doors at each location.

2.03 DOOR AND PANEL CORES

- A. Fire-Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.
- B. Sound-Rated Doors: Equivalent to type, with particleboard core (PC) construction as required to achieve STC rating specified; plies and faces as indicated above.

2.04 DOOR CONSTRUCTION

- A. Fabricate doors in accordance with door quality standard specified.
- B. Cores Constructed with stiles and rails:
- C. Provide solid blocks at lock edge for hardware reinforcement.
- D. Where supplementary protective edge trim is required, install trim after veneer facing has been applied full-width.
- E. Fit door edge trim to edge of stiles after applying veneer facing.
- F. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- G. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
- H. Provide edge clearances in accordance with the quality standard specified.

2.05 FINISHES - WOOD VENEER DOORS

- A. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
- B. Factory finish doors in accordance with approved sample.
- C. Seal door top edge with color sealer to match door facing.

2.06 ACCESSORIES

- A. Hollow Metal Door Frames: See Section 08 11 13.
- B. Door Hardware: See Section 08 71 00.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that opening sizes and tolerances are acceptable.
- B. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
 - 1. Install fire-rated doors in accordance with NFPA 80 requirements.
- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Use machine tools to cut or drill for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.

3.03 TOLERANCES

- A. Comply with specified quality standard for fit and clearance tolerances.
- B. Comply with specified quality standard for telegraphing, warp, and squareness.

3.04 ADJUSTING

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

END OF SECTION

Section 08 31 00
Access Doors and Panels

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wall- and ceiling-mounted access units.
- B. Access door and frame units, non-fire-rated, in wall and ceiling locations.

1.02 RELATED REQUIREMENTS

- A. Section 09 91 13 - Exterior Painting: Field paint finish.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.
- C. Manufacturer's Installation Instructions: Indicate installation requirements.
- D. Project Record Documents: Record actual locations of each access unit.

1.04 PROJECT CONDITIONS

- A. Coordinate the work with other work requiring access doors.

PART 2 PRODUCTS

2.01 ACCESS DOORS AND PANELS ASSEMBLIES

2.02 MANUFACTURERS

- A. Access Doors:
 - 1. Acudor Products Inc: www.acudor.com.
 - 2. Karp Associates, Inc: www.karpinc.com.
 - 3. Milcor by Commercial Products Group of Hart & Cooley, Inc; Product ____:
www.milcorinc.com.
 - 4. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 ACCESS DOORS AND PANELS

- A. All Units: Factory fabricated, fully assembled units with corner joints welded, filled, and ground flush; square and without rack or warp; coordinate requirements with assemblies units are to be installed in.

2.04 WALL- AND CEILING-MOUNTED ACCESS UNITS

- A. Door and Frame Units: Formed steel.
 - 1. Frames and flanges: 0.058 inch steel.
 - 2. Door panels: 0.070 inch single thickness steel sheet.
 - 3. Door/Panel Size: As indicated on the drawings.
 - 4. Hardware:
 - a. Hinges for Non-Fire-Rated Units: Concealed, constant force closure spring type.
 - b. Hinge: 175 degree stainless steel piano hinge with removable pin.
 - c. Latch/Lock: Screw driver slot for quarter turn cam latch.
 - 5. Galvanized, hot dipped finish.
 - 6. Prime coat with alkyd primer.
 - 7. Finish: One coat baked enamel, match adjacent surface color.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that rough openings are correctly sized and located.

3.02 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Install frames plumb and level in openings, and secure units rigidly in place.
- C. Position units to provide convenient access to concealed equipment when necessary.

END OF SECTION

**Section 08 35 13
Four-Fold Doors**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. A complete assembly of powered four-fold doors with powered operator complete including door sections, guides, hardware, operators, controls, and installation accessories.

1.02 RELATED REQUIREMENTS

- A. Section 04 22 00 - Concrete Unit Masonry
- B. Section 05 12 00 - Structural Steel Framing
- C. Section 08 80 00 - Glazing
- D. Section 26 05 00 - Common Work Results for Electrical

1.03 REFERENCE STANDARDS

- A. AISC (MAN) - Steel Construction Manual; 2023, with Errata (2025).
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- C. ASTM A48/A48M - Standard Specification for Gray Iron Castings; 2022.
- D. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.
- E. ASTM A513/A513M - Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing; 2025.
- F. 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; 2025.

1.04 SUBMITTALS

- A. Product Data: Provide data on door operation, hardware and accessories, electric operating components, colors and finishes available.
- B. Shop Drawings: Indicate opening sizes, details of supports, static and dynamic loads, adjacent construction and finish trim, and stacking sizes. Include wiring diagrams for coordination with electrical trade.

- C. Samples: Submit two samples of full manufacturer's color range for selection of colors.
- D. Maintenance Data: Describe cleaning materials detrimental to vinyl fabric surfaces and hardware finish. Include recommended cleaning methods, cleaning materials, and stain removal methods.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum 10 years documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Folding Doors Manufacturers:
 - 1. Door Engineering and Manufacturing; www.doorengineering.com (Basis of Design)
 - a. Model FF30
 - 2. Bator North America; www.bator.com
 - 3. International Door, Inc.; international-door.com

2.02 DESIGN CRITERIA

- A. Design doors to withstand horizontal wind loads in closed position as indicated on the structural drawings or a minimum of 25 pounds per square foot positive and negative wind load. Maximum deflection under full design load shall be 1/120 of the span. Fiber stress in main members shall be limited to 27,000PSI. Steel frames shall be designed in accordance with "AISC Steel Construction Manual" AISC (MAN)

2.03 MATERIALS

- A. Steel Tubing, Electric Welded: ASTM A513/A513M
- B. Steel Tubing, Structural Welded: ASTM A500/A500M Grade B
- C. Structural Shapes and plates: ASTM A36/A36M
- D. Castings, Cast Iron: ASTM A48/A48M
- E. Face Sheets: Steel sheet metal, flat, hot rolled, 14 gauge minimum ASTM A1011/A1011M
- F. Glazing: Tempered. Refer to 08 80 00 - Glazing for additional requirements

2.04 DOOR MATERIAL AND CONSTRUCTION

- A. Door frame shall be a minimum of 11-gauge structural steel tube.

- B. Door leaves shall be faced on the exterior side with 14-gauge sheet steel welded to stiles, rails and bracing members from the inside. There shall be no exposed welds on exterior panels. All exterior doors shall be fully insulated with thermal insulation, full thickness of panel: door shall be covered on the inside with 14-gauge sheet steel welded to stiles, rails and bracing members. All interior welds are to be ground smooth
- C. Surface Mounted Tube Frame: Manufacturer shall supply pre-hung tube frame system, designed to anchor to structural support OR masonry as provided per project documents. All hinges, track supports and operator supports shall be weld attached at the factory.
- D. Hardware: Hardware shall include guide tracks and brackets, trolleys, center guides, not less than three pairs of jamb and fold hinges per opening, and all bolts, nuts, fasteners, etc. necessary for complete installation and operation.
 - 1. All hardware, including hinges and trolleys, shall be bolted to the panel for easy removal for service or panel replacement.
 - 2. Doors up to 16' wide and under 30psf windload shall require no floor mounted supports, guides or tracks.
 - 3. Top tracks shall be adjustable on the end track hangers to allow for adjustment of the door panels in the open position and easily replaceable without removal of the door framing or operators.
- E. Hinges: Jamb hinges shall be dual shear and have two thrust bearings and two needle bearings. Fold hinges shall be stainless steel and be dual shear with two thrust bearings. All bearings shall be completely concealed within the hinge barrel and include grease zerks. All hinge pins shall be minimum 3/4" diameter hardened steel.
- F. Hinge Guards: Provide plastic guards at jamb hinges to prevent access through hinge space.
- G. Vision Panels: Provide 1" insulated, tempered, vision panels of the size, shape and location as noted on the drawings.
- H. Weather stripping shall be provided and installed along the bottom of each leaf and at vertical joints of leaves at centerline, to provide a substantially weather tight installation. Weather strip material shall be cloth inserted neoprene adjustable and readily replaceable.
- I. Finish:
 - 1. Door Panels and Tube Frames shall be factory finished with manufacturer's standard epoxy primer and polyurethane top coat. Color as selected by architect using "RAL" standard.
 - 2. Operator and operating hardware shall be powder-coated manufacturer's standard neutral color.

2.05 OPERATOR

- A. Four fold door shall be operated by an overhead mounted electro-mechanical drive unit, designed for heavy duty high cycle operation. Operator consists of a single electric geared brake motor, and rotating drive arm. The door shall be operated with connecting rods attached to the rotating drive arm on the operator and to control arms attached to the jamb door sections and to the door lintel. The connecting rods shall be positive drive, keeping the door under firm

control at all times. The connecting rods shall be fitted with spherical bearings and control arms shall be fitted with permanently lubricated ball bearings

1. Operator shall open and close door with smooth acceleration and deceleration, easily and quietly without jarring under all conditions of wind pressure.
 2. Operator shall be adjustable to allow door to clear the opening.
 3. Operator shall automatically lock the door in the closed position.
 4. Operator shall be equipped with disconnect mechanism to convert to freewheeling mode for manual operation.
 5. Motor, brake, and open and close limit switches are to be factory mounted and pre-wired to a terminal block in a NEMA 12 enclosure mounted on door operator. All materials necessary for the pre-wired assembly shall conform to J.I.C. electrical standards for equipment and connections. The door contractor shall furnish and install the electric door operator including the motor, with "open-close" limit switches, hand chain disconnect switched, solenoid, brake, all pre-wired to a terminal box mounted adjacent to the motor.
- B. Electric motor shall be of sufficient size to operate doors under normal operating conditions at no more than 75 percent of rated capacity. The motor shall be wound for three phase 208/230/480 VAC, 60 Hertz operation. Motor shall be totally enclosed, ball bearing, and continuous duty and of capacity sufficient to operate the door at specified speed without exceeding a temperature rise of 55 degrees Celsius. Braking device to be operated automatically by a solenoid and be adjustable to suit the requirements of the door.
1. Voltage: To match voltage provided - refer to electrical panel schedule.
- C. Electric Controls: Controls shall be furnished by the door manufacturer and shall be complete for each door, and built in accordance with the latest NEMA standards. Incoming electrical shall be as indicated on the Electrical Drawings.
1. Controls shall include a programmable logic controller with digital message display or LED indicators. Controller shall include programmable close timers and programmable inputs/outputs.
 2. Motor starters shall be magnetic reversing, factory wired with overload and under voltage protection, and equipped with mechanical interlocks. All control components shall be enclosed in one enclosure with a wiring diagram placed on the inside of the cover.
 3. If incoming voltage is single phase, control panel shall include a variable frequency drive to convert voltage to 3-phase for the motor
 4. Enclosures shall be NEMA 4 with disconnect switch.
 5. Pushbuttons (interior) for each door shall have one (1) momentary pressure three-button push-button station marked "OPEN", "CLOSE" and "STOP".
 - a. Push button controls shall be recessed NEMA 1.
 - b. Push button controls shall be permanently labeled to identify which door they operate.
 6. System shall include a master push button station with pushbutton controls for each door contained in a single enclosure.
 - a. Face plate to be #304 stainless steel
 - b. Labels for each door to be laser etched and painted.
 - c. Push button controls shall be recessed NEMA 1.
 - d. Push button controls shall be permanently labeled to identify which door they operate.
 7. Limit switches shall be provided to stop the travel of the door in its fully open or fully closed position.
 8. Safety edges: Provide electric safety edges on leading edge of all doors to reverse door upon contact with obstruction.

9. Photo eyes: Provide (1) exterior, jamb mounted, thru-beam type photo eyes, NEMA 4 rated.
10. Presence Sensor: Provide (1) interior, overhead mounted, presence sensor with active infrared and adjustable field at each door.
11. Radio Controls: Provide one (1) radio receiver and (2) single button remotes per door. Remotes to open and close doors with single button.
12. Safety Detectors: Provide “safety” detector to reverse or hold the door open when obstruction is detected.
13. Timer Activation Loop Detectors: Provide “pulse on exit type” loop detector to activate auto close timer once loop has been activated and cleared, include hand/auto switch to deactivate timer.
14. Wiring: Door manufacturer shall supply controls and components only. Electrical contractor shall install controls and furnish and install conduits and wiring for jobsite power and control wiring.
15. Doors shall cycle open and closed in minimum acceptable time as specified by County. In event of operator failure, the operator should have means of disconnection for manual operation of the door.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that field measurements are as indicated.

3.02 INSTALLATION

- A. Install door in accordance with manufacturer's instructions.
- B. Fit and align door assembly level and plumb.
- C. Lubricate moving components.

3.03 ADJUSTING AND CLEANING

- A. Adjust door to provide smooth operation from closed to full open position.
- B. Visually inspect door in fully closed position for light leaks to identify a potential acoustical leak, and adjust to achieve light tight seal.
- C. Clean surfaces and repaint abraded or damaged finished surfaces to match factory applied finish.

3.04 CLOSEOUT ACTIVITIES

- A. Demonstrate operation of door and identify potential operational problems.

END OF SECTION

Section 08 36 13
Sectional Doors

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Overhead sectional doors, electrically operated.
- B. Electronically-powered automatic overhead door operator and mounting kit
- C. All low voltage control wiring to be provided and installed by this section. Installation is to be under the construction quality and techniques outlined in Division 26.
- D. All accessories, attachments, and control safety devices necessary to provide a complete installation.

1.02 RELATED REQUIREMENTS

- A. Section 04220 - Concrete Unit Masonry
- B. Section 05 12 00 - Structural Steel and Miscellaneous Iron
- C. Section 09 91 23 - Interior Painting: Finish painting.
- D. Division 26 Electrical: Electrical service to disconnect located near door operator.

1.03 REFERENCE STANDARDS

- A. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.
- B. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.
- C. DASMA 102 - American National Standard Specifications for Sectional Overhead Type Doors; 2011.
- D. ITS (DIR) - Directory of Listed Products; current edition.
- E. NEMA MG 00001 - Motors and Generators; 2024.
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.
- C. Product Data: Show component construction, anchorage method, and hardware.
 - 1. Include data for motor and transmission, shaft and gearing, lubrication frequency, spare parts resources.
- D. Manufacturer's Installation Instructions: Include any special procedures required by project conditions.
- E. Operation Data: Include normal operation, troubleshooting, and adjusting.
- F. Maintenance Data: Include data for motor and transmission, shaft and gearing, lubrication frequency, spare part sources.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Installer: Company specializing in performing the work of this section with minimum 5 years of experience and authorized by the manufacturer.
- C. Products Requiring Electrical Connection: Listed and classified by ITS (DIR), UL (DIR), or testing firm acceptable to authorities having jurisdiction, as suitable for purpose specified.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials and products in labeled protective packages. Store and handle in compliance with manufacturer's instructions and recommendations. Protect from damage from weather, excessive temperatures, and construction operations

1.07 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for warranty requirements.
- B. Extended Correction Period: Correct defective work within a 2-year period commencing on Date of Substantial Completion.
- C. Provide three year manufacturer warranty for finish, doors, tracks, and electric operating equipment.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Raynor Door: ThermaSeal TMC200C: www.raynor.com (Basis of Design)
- B. Overhead Door: www.overheaddoor.com
- C. Approved Equal

2.02 PERFORMANCE REQUIREMENTS

- A. Performance: Withstand positive and negative wind loads equal to 1.5 times design wind loads specified by local code without damage or permanent set, when tested in accordance with ASTM E330/E330M, using 10 second duration of maximum load.
- B. Air Leakage Rate: Less than 0.22 cfm/sq ft when tested in accordance with ASTM E283/E283M at test pressure difference of 1.57 psf.
- C. Thermal Transmittance: U-factor of 0.17 Btu/hr sq ft degrees F, maximum, in accordance with DASMA 102.

2.03 STEEL DOORS

- A. Doors: Flush steel, insulated; standard lift operating style with track and hardware; complying with DASMA 102, Commercial application.
 - 1. Door Panels: Steel construction; outer steel sheet of 26 gauge, 0.016 inch minimum thickness, flush profile; inner steel sheet of 27 gauge, 0.0164 inch minimum thickness, flat profile; rabbeted weather joints at meeting rails; polyurethane insulation.
 - 2. Door Nominal Thickness: 2 inches thick.
 - 3. Exterior Finish:
 - a. Factory finished with acrylic baked enamel; color as selected by Architect.
 - 4. Interior Finish:
 - a. Factory finished with powder coated finish; white color.
 - 5. End Styles: 16 gauge
 - 6. Exterior Surface: Ribbed, Textured
 - 7. Springs: High Cycle - 100,00 cycles
 - 8. Air Infiltration: .08 cfm at 15 mph: .13 cfm at 25 mph
 - 9. High Usage Package: Required
 - 10. Weatherstripping: EPDM rubber tube seals fitted inside joints between sections. EPDM rubber bulb-type strip at bottom. (Header seal and jamb weatherstripping).
 - 11. Hardware: Galvanized steel hinges and fixtures. Ball bearing rollers with hardened steel races.
 - 12. Track: Provide 3-inch track as recommended by manufacturer to suit loading required and clearances available.
 - 13. Glazed Lights: Full panel width, two row; set in place with security glazing stops. Refer to Exterior Elevations and Door Schedule.
 - a. Glazing: Fully tempered glass; insulated glass units; tinted; 1/2 inch nominal overall thickness.

- b. Tinted glazing to match balance of exterior glazing.
- 14. Electric Operation: Electric control station.

2.04 DOOR OPERATOR

- A. Reference Product:
 - 1. Control Hoist 2.0 Optima by Raynor
 - 2. Electrical: ½ HP, 115-volt, single phase, fully enclosed, instant reversing.
 - 3. Type: Jackshaft with manual chain hoist
 - 4. Duty Cycle: 60 cycles per hour during peak usage periods
 - 5. Door to be manually operable in case of power failure.
 - 6. Mounting: Wall mounting
- B. Door Control Characteristics
 - 1. Recessed momentary contact OPEN-CLOSE with spring return, mounted in apparatus bay per plans. Coordinate with Electrical Contractor. All low voltage wiring to be installed under this section. Locate on driver's side.
 - 2. Remote Controls: Digital radio controls for door operation – provide four (4) remote-control units for each opener.
 - 3. Entrapment Protection –
 - a. Primary: Provide photoelectric sensors.
 - b. Secondary: Wired monitored electric reversing edge extending the full width of the door.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.
- B. Verify that electric power is available and of the correct characteristics.

3.02 PREPARATION

- A. Prepare opening to permit correct installation of door unit to perimeter air and vapor barrier seal.
- B. Apply primer to wood frame.

3.03 INSTALLATION

- A. Install door unit assembly in accordance with manufacturer's instructions.
- B. Anchor assembly to wall construction and building framing without distortion or stress.
- C. Securely brace door tracks suspended from structure. Secure tracks to structural members only.
- D. Fit and align door assembly including hardware.

- E. Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.

3.04 TOLERANCES

- A. Maximum Variation from Plumb: 1/16 inch.
- B. Maximum Variation from Level: 1/16 inch.
- C. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch from 10 ft straight edge.
- D. Maintain dimensional tolerances and alignment with adjacent work.

3.05 ADJUSTING

- A. Adjust door assembly for smooth operation and full contact with weatherstripping.

3.06 CLEANING

- A. Clean doors and frames and glazing.
- B. Remove temporary labels and visible markings.

3.07 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.
- B. Clean doors, frames and glazing.
- C. Remove temporary labels and visible markings.
- D. Do not permit construction traffic through overhead door openings after adjustment and cleaning.

END OF SECTION

Section 08 43 13
Aluminum-Framed Storefronts

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum-framed storefront, with vision glass.
- B. Aluminum doors and frames.
- C. Weatherstripping.
- D. Door hardware.
- E. All required attachments, trim, and accessories to provide a complete installation.

1.02 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry
- B. Section 07 90 05 - Joint Sealers: Perimeter sealant and back-up materials.
- C. Section 08 51 13 - Aluminum Windows: Operable sash within glazing system.
- D. Section 08 71 00 - Door Hardware: Hardware items other than specified in this section.
- E. Section 08 80 00 - Glazing: Glass and glazing accessories.
- F. Section 08 88 37 - Glazing with Integral Louvers : Blinds between glass

1.03 REFERENCE STANDARDS

- A. AAMA 611 - Specification for Anodized Architectural Aluminum; 2024.
- B. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.
- C. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels; 2013.
- A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.

- D. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- E. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.
- F. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.
- G. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.
- H. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with installation of other components that comprise the exterior enclosure.

1.05 PERFORMANCE REQUIREMENTS

- A. Design and size components to withstand the following load requirements without damage or permanent set, when tested in accordance with ASTM E 330, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
 - 1. Design Wind Loads: Comply with requirements of California Building code.
 - a. 70 mph wind speed, exposure C
 - 2. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
- B. Movement: Accommodate movement between storefront and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
- C. Air Infiltration: Limit air infiltration through assembly to 0.06 cu ft/min/sq ft of wall area, measured at a reference differential pressure across assembly of 1.57 psf as measured in accordance with ASTM E 283.
- D. Water Leakage: None, when measured in accordance with ASTM E 331 with a test pressure difference of 6.00 lbf/sq ft.
- E. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
- F. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.

1.06 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, and internal drainage details.
- C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.

1.07 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.
- B. Installer - The storefront installer shall be currently approved by the manufacturer, and have experience of at least five (5) years installing the selected system.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.
- C. Replacements - In the event of damage, including water intrusion, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the University.

1.09 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 five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.
- D. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Aluminum-Framed Storefronts:
 - 1. Arcadia, Inc; AG451T: www.arcadiainc.com/#sle.
 - 2. Kawneer North America; Trifab 451T: www.kawneer.com/#sle.

3. Oldcastle BuildingEnvelope; 3000 XT: www.oldcastlebe.com/#sle.

2.02 BASIS OF DESIGN -- FRAMING FOR INSULATING GLAZING

- A. Center-Set Style, Thermally-Broken:
 1. Basis of Design: Trifab Versaglaze 451/451T Framing System.
 2. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep.
- B. Center-Set Narrow Style, Thermally-Broken Entrance System:
 1. Basis of Design: 500T Insupour Thermal Entrance.
 2. Vertical Mullion Dimensions: 5 inches wide by 2 1/4 inches deep.
 3. Top Rail Height: 5 inch.
 4. Bottom Rail Height: 10 inch.

2.03 MANUFACTURERS

- A. All storefront and entrances system components shall be the product of a single manufacturer and represent an integrated system.
- B. The aluminum storefront system was designed based on the product of Kawneer as a standard of quality.

2.04 ALUMINUM-FRAMED STOREFRONT

- A. Glazing: Refer to Section 08 80 00 Glazing.
- B. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 1. Condensation Resistance Factor: 40 minimum
 2. Finish: Class I color anodized.
 - a. Factory finish all surfaces that will be exposed in completed assemblies.
 3. Finish Color: Dark bronze.
 4. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
 5. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
 6. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
 7. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
 8. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
 9. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.

C. Performance Requirements

1. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
 - a. Design Wind Loads: Comply with requirements of ASCE 7.
 - b. Member Deflection: Limit member deflection to 1/175 in any direction, with full recovery of glazing materials.
2. Air Leakage: 1.0 cfm/sq ft maximum leakage of storefront wall area when tested in accordance with ASTM E283/E283M at 1.57 psf pressure difference.
3. Condensation Resistance Factor of Framing: 50, minimum, measured in accordance with AAMA 1503.

2.05 COMPONENTS

- A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
 1. Framing members for interior applications need not be thermally broken.
 2. Fabrication Method – Shearblock or equal. Use of exposed fasteners and stacking system with receptor sill not acceptable.
 3. Glazing Stops: Flush.
- B. Glazing: See Section 08 80 00.
- C. Doors: Glazed aluminum. Series 500 wide Stile
 1. Thickness: 2-1/4 inches (57 mm).
 2. Top Rail: 5 inches wide.
 3. Vertical Stiles: 5 inches wide.
 4. Bottom Rail: 10 inches wide.
 5. Glazing Stops: Square.
 6. Finish: Same as storefront.
 7. Pull Handles: See Section 08 7100
 8. Hinges: Kawneer 4 1/2 x4 ball bearing butt hinge with non-removable pin or equal .
 9. Exit Device: See Section 08 71 00 - Door Hardware

2.06 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Structural Steel Sections: ASTM A36/A36M; galvanized in accordance with requirements of ASTM A123/A123M.
- C. Fasteners: Stainless steel.
- D. Sealant for Setting Thresholds: Non-curing butyl type.
- E. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- F. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

2.07 FINISHES

- A. Comply with AA DAF-45 for aluminum finishes required.
- B. Class I Color Anodized Finish: AAMA 611 AA-M12C22A42 Integrally colored anodic coating not less than 0.7 mils thick.

2.08 HARDWARE

- A. General: Refer to Section 08 71 00 - Door Hardware for requirements for hardware items other than those indicated to be provided by the aluminum entrance manufacturer.
- B. Provide heavy-duty hardware units as indicated, scheduled, or required for operation of each door, including the following items of sizes, number, and type recommended by manufacturer for service required; finish to match door.
 - 1. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.
 - 2. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all doors.

2.09 FABRICATION

- A. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
- B. Develop drainage holes with moisture pattern to exterior.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify that storefront wall openings and adjoining water-resistive and/or air barrier seal materials are ready to receive work of this section.

3.02 INSTALLATION

- A. Install wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

- G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.
- H. Coordinate attachment and seal of perimeter air and vapor barrier materials.
- I. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- J. Install hardware using templates provided.
- K. Install glass and infill panels using glazing method required to achieve performance criteria; see Section 08 80 00.
- L. Install perimeter sealant in accordance with Section 07 90 05.
- M. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLERANCES

- A. Maximum Variation from Plumb: 0.06 inch per 3 feet non-cumulative or 0.06 inch per 10 feet, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.04 ADJUSTING

- A. Adjust operating hardware and sash for smooth operation.
- B. Opening force for doors not to exceed 5 lbs of force

3.05 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Remove excess sealant by method acceptable to sealant manufacturer.

3.06 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

Section 08 51 13
Aluminum Windows

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Extruded aluminum windows with fixed sash, operating sash, and infill panels.
- B. Factory glazing and site glazing.
- C. Operating hardware.
- D. Insect screens.

1.02 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Rough opening framing.
- B. Section 07 25 00 - Weather Barriers: Sealing frame to water-resistive barrier installed on adjacent construction.
- C. Section 07411 - Preformed Metal Wall Panels
- D. Section 07620 - Sheet Metal Flashing and Trim
- E. Section 07650 - Flexible Flashing
- F. Section 08 80 00 - Glazing.

1.03 REFERENCE STANDARDS

- A. AA DAF-45 - Designation System for Aluminum Finishes; The Aluminum Association, Inc.; 2003.
- B. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.
- C. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2015.
- D. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.
- E. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for windows, doors, and skylights; 2011.

- F. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.
- G. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- H. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.
- I. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2023).

1.04 PERFORMANCE REQUIREMENTS

- A. Design and size windows to withstand the following load requirements, when tested in accordance with ASTM E 330 using test loads equal to 1.5 times the design wind loads with 10 second duration of maximum load:
 - 1. Design Wind Loads: Comply with requirements of CBC code.
 - 2. Positive Design Wind Load: 70 lbf/sq ft.
 - 3. Negative Design Wind Load: 70 lbf/sq ft.
 - 4. Member Deflection: Limit member deflection to 1/175 in any direction, with full recovery of glazing materials.
- B. Movement: Accommodate movement between window and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
- C. Thermal Resistance: Not more than .59 BTU/hr/sf/deg F when tested in accordance with AAMA 1503.1
- D. Air Infiltration: Limit air infiltration through assembly to 0.1 cu ft/min/sq ft of wall area, measured at a reference differential pressure across assembly of 6.24 psf as measured in accordance with ASTM E 283.
- E. Condensation Resistance Factor: CRF of 53 when measured in accordance with AAMA 1503.1.
- F. Water Leakage: None, when measured in accordance with ASTM E 331 with a test pressure difference of 12 lbf/sq ft.
- G. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, or migrating moisture occurring within system.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Include component dimensions, information on glass and glazing, internal drainage details, and descriptions of hardware and accessories.

- C. Shop Drawings: Indicate opening dimensions, elevations of different types, framed opening tolerances, method for achieving air and vapor barrier seal to adjacent construction, anchorage locations, and installation requirements.
- D. Manufacturer's Installation Instructions: Include complete preparation, installation, and cleaning requirements.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.
- B. The architectural aluminum supplier shall have a quality system registered to one of the ISO 9000 series of standards. The quality system shall be certified by a Registrar approved by the Accreditation Board (RAB) or another, international approval authority.
 - 1. The certificate shall be current and in good standing with the Registrar which issued it.
 - 2. The supplier shall furnish, upon request, a copy or copies of the current certificate.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of AAMA CW-10.
- B. Protect finished surfaces with wrapping paper or strippable coating during installation. Do not use adhesive papers or sprayed coatings that bond to substrate when exposed to sunlight or weather.

1.08 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.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Aluminum Windows:
 - 1. Kawneer; www.kawneer.com - 8225TL Thermal Windows
 - 2. EFCO, a Pella Company; Thermal Windows: www.efcocorp.com/#sle.
- B. Substitutions: See Section 01310 - Substitutions

2.02 ALUMINUM WINDOWS

- A. Aluminum Windows: Extruded aluminum frame and sash, factory fabricated, factory finished, with operating hardware, related flashings, and anchorage and attachment devices.
 - 1. Frame Depth: 2-1/2 inches.

2. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for operating hardware and imposed loads.
 3. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
 4. Movement: Accommodate movement between window and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
 5. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
 6. Air Infiltration: Limit air infiltration through assembly to .30 cu ft/min/sq ft of wall area, measured at a specified differential pressure across assembly in accordance with ASTM E283.
 7. Water Infiltration Test Pressure Differential: 15 pounds per square foot.
 8. Condensation Resistance Factor: 58 minimum.
 9. Overall U-value, Including Glazing: 0.60, maximum.
 10. Life Cycle Requirements: No damage to fasteners, hardware parts or other components that would render operable windows in operable and not reduction in air and water infiltration resistance when tested according to AAMA 910.
- B. Fixed, Non-Operable Type:
1. Construction: Thermally broken.
 2. Glazing: Double; clear; low-e.
 3. Exterior Finish: Class I color anodized.
 4. Interior Finish: Class I color anodized.
- C. Outswinging Casement Type:
1. Construction: Thermally broken.
 2. Provide screens.
 3. Glazing: Double; clear; low-e.
 4. Exterior Finish: Class I color anodized.
 5. Interior Finish: Class I color anodized.
 6. Butt hinges
 7. Roto operator
- D. Awning Type:
1. Construction: Thermally broken.
 2. Provide screens.
 3. Glazing: Double; clear; low-e.
 4. Exterior Finish: Class I color anodized.
 5. Interior Finish: Class I color anodized.

2.03 COMPONENTS

- A. Frames: 2 1/2" inch wide, of 0.090 inch thick section; thermally broken with interior portion of frame insulated from exterior portion; flush glass stops of snap-on type.
- B. Glazing: See Section 08 80 00.

- C. Thermal Barrier. The thermal barrier shall be a minimum 3.8" (9.5) separation consisting of a two-part, chemically curing high density polyurethane which is mechanically and adhesively bonded to the aluminum.
- D. Sills: Provide a Kawneer "Full Depth Sill" at all sills
- E. Sill Extension: Provide a Kawneer "Sub Sill" as shown on drawings. Size per drawings.
- F. Insect Screens: 14/18 mesh, steel strands.
- G. Operable Sash Weatherstripping: Nylon pile; permanently resilient, profiled to achieve effective weather seal.
- H. Glazing Materials: See Section 08 80 00.
- I. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

2.04 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.

2.05 HARDWARE

- A. Sash lock: Lever handle with cam lock.
- B. Operator: Geared rotary handle fitted to projecting sash arms with limit stops.
- C. Projecting Sash Arms: Cadmium plated steel, friction pivot joints with nylon bearings, removable pivot clips for cleaning.
- D. Pulls: Manufacturer's standard type.
- E. Bottom Rollers: Stainless steel, adjustable.
- F. Limit Stops: Resilient rubber.

2.06 FABRICATION

- A. Fabricate components with smallest possible clearances and shim spacing around perimeter of assembly that will enable window installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C. Prepare components to receive anchor devices.
- D. Arrange fasteners and attachments to ensure concealment from view.
- E. Prepare components with internal reinforcement for operating hardware.
- F. Provide internal drainage of glazing spaces to exterior through weep holes.

2.07 FINISHES

- A. Class I Color Anodized Finish: AAMA 611 AA-C22A44 Electrolytically deposited colored anodic coating not less than 0.7 mils thick; dark bronze.
- B. Apply one coat of bituminous coating to concealed aluminum and steel surfaces in contact with dissimilar materials.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that wall openings and adjoining water-resistive barrier materials are ready to receive aluminum windows; see Section 07 25 00.

3.02 PRIME WINDOW INSTALLATION

- A. Install windows in accordance with manufacturer's instructions.
- B. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.
- C. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.
- D. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- E. Install operating hardware not pre-installed by manufacturer.
- F. Install glass and infill panels in accordance with requirements; see Section 08 80 00.
- G. Dissimilar Materials: Provide separation of aluminum materials and other corrodible surfaces from sources of corrosion or electrolytic action contact points by complying with AAMA 101, Appendix, titled "Dissimilar Materials."

3.03 TOLERANCES

- A. Maximum Variation from Level or Plumb: 1/16 inches every 3 ft non-cumulative or 1/8 inches per 10 ft, whichever is less.

3.04 ADJUSTING

- A. Adjust hardware for smooth operation and secure weathertight closure.

3.05 CLEANING

- A. Adjust hardware for smooth operation and secure weathertight closure.

- B. Remove protective material from factory finished aluminum surfaces.
- C. Remove excess glazing sealant by moderate use of mineral spirits or other solvent acceptable to sealant and window manufacturer.

END OF SECTION

Section 08 71 00

Door Hardware

PART 1 GENERAL

1.01 SECTION INCLUDES BUT IS NOT LIMITED TO:

- A. Door hardware
- B. Hardware for fire-rated doors.
- C. Battery powered electrically operated and controlled hardware.
- D. Lock cylinders for doors that hardware is specified in other sections.
- E. Thresholds.
- F. Weatherstripping and gasketing.
- G. Gate locks.
- H. Storefront and entrance door hardware.
- I. Gate Hardware.

1.02 RELATED REQUIREMENTS

- A. Section 07 92 00 - Joint Sealants: Sealants for setting exterior door thresholds.
- B. Section 08 11 13 - Hollow Metal Doors and Frames.
- C. Section 08 14 16 - Flush Wood Doors.
- D. Section 08 43 13 - Aluminum-Framed Storefronts: Door hardware, except as noted in section.
- E. Section 10 14 00 - Signage: Additional signage requirements.

1.03 PRICE AND PAYMENT PROCEDURES

- A. Procure scheduled Best brand temporary and permanent cylinder cores and keys from (Owner's lock shop / Owner's Physical Plant Maintenance Dept). Allow \$45 per core and \$7.50 per key. Owner's agent will purchase the cores and keys directly from Best Access Systems or provide the units from Owner's attic stock.

1.04 QUALITY ASSURANCE - INSTALLER

- A. Work to be performed only by workers thoroughly skilled and specially trained in the techniques of installing finish hardware, and who are completely familiar with the published recommendations of the manufacturer of the material being used.

1.05 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus; 2011.
- C. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.
- D. BHMA (CPD) - Certified Products Directory; 2016.
- E. BHMA A156.1 - American National Standard for Butts and Hinges; 2013.
- F. BHMA A156.2 - American National Standard for Bored and Preassembled Locks & Latches; 2011.
- G. BHMA A156.3 - American National Standard for Exit Devices; 2014.
- H. BHMA A156.4 - American National Standard for Door Controls - Closers; 2013.
- I. BHMA A156.6 - American National Standard for Architectural Door Trim; 2010.
- J. BHMA A156.8 - American National Standard for Door Controls - Overhead Stops and Holders; 2010.
- K. BHMA A156.13 - American National Standard for Mortise Locks & Latches Series 1000; 2012.
- L. BHMA A156.16 - American National Standard for Auxiliary Hardware; 2013.
- M. BHMA A156.18 - American National Standard for Materials and Finishes; 2012.
- N. BHMA A156.21 - American National Standard for Thresholds; 2014.
- O. BHMA A156.22 - American National Standard for Door Gasketing and Edge Seal Systems, Builders Hardware Manufacturers Association; 2012.
- P. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2014.
- Q. BHMA A156.115W - Hardware Preparation in Wood Doors with Wood or Steel Frames; 2006.

- R. CBC Chapter 11B - California Building Code - Accessibility to Public Buildings, Public Accommodations, Commercial Buildings and Public Housing; 2016.
- S. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2009.
- T. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.
- U. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives; 2022.
- V. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.
- W. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.
- X. UL 10B - Standard for Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- Y. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.06 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the manufacture, fabrication, and installation of products that door hardware is installed on.
- B. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.

1.07 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project, and includes construction details, material descriptions, finishes, and dimensions and profiles of individual components.
- C. Shop Drawings - Door Hardware Schedule: Submit detailed listing that includes each item of hardware to be installed on each door. Use door numbering scheme as included in Contract Documents.
 - 1. Prepared by or under supervision of Architectural Hardware Consultant (AHC).
 - 2. Provide complete description for each door listed.
 - 3. Provide manufacturer name, product names, and catalog numbers; include functions, types, styles, sizes and finishes of each item.
 - 4. Include account of abbreviations and symbols used in schedule.
- D. Bid and submit manufacturer's updated/improved item if scheduled item is discontinued.
- E. 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.

- F. 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.
- G. Items listed with no substitute manufacturers have been requested by Owner to meet existing standard.
- H. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
- I. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.

1.08 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.
- B. Supplier Qualifications: Company with certified Architectural Hardware Consultant (AHC) to assist in work of this section.

1.09 PROJECT CONDITIONS AND COORDINATION:

- A. Where exact types of hardware specified are not adaptable to finished shape or size of members requiring hardware, provide suitable types having as nearly as practical the same operation and quality as type specified, subject to Architect's approval.
- B. Coordination: Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents. Furnish related trades with the following information:
 - 1. Location of embedded and attached items to concrete.
 - 2. Location of wall-mounted hardware, including wall stops.
 - 3. Location of finish floor materials and floor-mounted hardware.
 - 4. Locations for conduit and raceways as needed for electrical, electronic and electro-pneumatic hardware items. Fire/life-safety system interfacing. Point-to-point wiring diagrams plus riser diagrams to related trades.
 - 5. Coordinate: low-voltage power supply locations.
 - 6. Coordinate: flush top rails of doors at outswinging 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.

1.10 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer's Warranty: Provide warranty against defects in material and workmanship for period indicated. Complete forms in County's name and register with manufacturer.
 - 1. Closers: 30 years mechanical, minimum.
 - 2. Exit Devices: Ten years mechanical, one year electrical, minimum.
 - 3. Mortise Locksets: Ten years mechanical minimum.
 - 4. Stand alone electric locks: One year minimum
 - 5. Hinges: One year minimum
 - 6. Continuous Hinges: Lifetime, one year electrified
 - 7. Automatic Door Bottoms: Three years, minimum.
 - 8. Other Hardware: Two years, minimum.
- C. Include factory order numbers with close-out documents to validate warranty information, required for Owner in making future warranty claims

1.11 COMMISSIONING:

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

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

- A. Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.
- B. Provide individual items of single type, of same model, and by same manufacturer.
- C. Provide door hardware products that comply with the following requirements:
 - 1. Applicable provisions of state and local codes.
 - 2. Accessibility: ADA Standards and ICC A117.1.
 - 3. Fire-Rated Doors: NFPA 80, listed and labeled by qualified testing agency for fire protection ratings indicated, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.
 - 4. Hardware on Fire-Rated Doors: Listed and classified by UL (DIR) as suitable for application indicated.
 - 5. Listed and certified compliant with specified standards by BHMA (CPD).
 - 6. Hardware Preparation for Steel Doors and Steel Frames: BHMA A156.115.
 - 7. Hardware Preparation for Wood Doors with Wood or Steel Frames: BHMA A156.115W.
- D. Fasteners:

1. Provide fasteners of proper type, size, quantity, and finish that comply with commercially recognized standards for proposed applications.
 - a. Aluminum fasteners are not permitted.
 - b. Provide phillips flat-head screws with heads finished to match door surface hardware unless otherwise indicated.
2. Provide machine screws for attachment to reinforced hollow metal and aluminum frames.
 - a. Self-drilling (Tek) type screws are not permitted.
3. Provide spacers or sex bolts with sleeves for through bolting of hollow metal doors and frames.
4. Fire-Rated Applications: Comply with NFPA 80.
 - a. Provide wood or machine screws for hinges mortised to doors or frames, strike plates to frames, and closers to doors and frames.
 - b. Provide steel through bolts for attachment of surface mounted closers, hinges, or exit devices to door panels unless proper door blocking is provided.

2.02 HINGES

- A. Manufacturers:
 1. Ives, an Allegion brand; Basis of design: www.allegion.com/us/#sle.
 2. McKinney; an Assa Abloy Group company: www.assaabloydss.com/#sle.
 3. Stanley, dormakaba Group: www.stanleyhardwarefordoors.com/#sle.
- B. Hinges: Comply with BHMA A156.1, Grade 1.
 1. Provide hinges on every swinging door.
 2. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
 3. Provide ball-bearing hinges at each door.
 4. Provide non-removable pins on exterior outswinging doors.
 5. 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.
 6. 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. Continuous Hinges:
 1. Geared-type aluminum.
 - a. Use wide-throw units where needed for maximum degree of swing, advise architect if commonly available hinges are insufficient.
 - b. If units are used at storefront openings, color-coordinate hinge finish with storefront color. Custom anodizing and custom powdercoat finishes subject to Architect approval.
 2. Pinned steel/stainless steel type: continuous stainless steel, 0.25-inch diameter stainless-steel hinge pin.
 - a. Use engineered application-specific wide-throw units as needed to provide maximum swing degree of swing, advise architect if required width exceeds 8 inches.

2.03 FLUSH BOLTS

- A. Manufacturers:
 - 1. Adams Rite, an Assa Abloy Group company: www.assaabloydss.com/#sle.
 - 2. Ives, an Allegion brand; Basis of design: www.allegion.com/us/#sle.
 - 3. DCI (Door Controls International); www.accesshardware.com.
 - 4. Substitutions: See Section 01 61 00 - Product Requirements.
- B. Flush Bolts: Comply with BHMA A156.16, Grade 1.
 - 1. Flush Bolt Throw: 3/4 inch, minimum.
 - 2. Provides extension bolts in leading edge of door, one bolt into floor, one bolt into top of frame.
 - a. Pairs of Swing Doors: At inactive leaves, provide flush bolts of type as required to comply with code.
 - 3. Provide dustproof floor strike for bolt into floor, except at metal thresholds.
 - 4. Manual Flush Bolts: Provide lever extensions for top bolt at over-sized doors.
 - 5. Self-Latching Flush Bolts: Automatically latch upon closing of door; manually retracted; located on inactive leaf of pair of doors.
 - 6. Automatic Flush Bolts: Automatically latch upon closing of door; automatic retraction of bolts when active leaf is opened; located on inactive leaf of pair of doors.

2.04 EXIT DEVICES

- A. Manufacturers:
 - 1. Von Duprin, an Allegion brand: www.allegion.com/us/#sle.
- B. Exit Devices: Comply with BHMA A156.3, Grade 1.
 - 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 Chapter 11B-404.2.9 and 11B-309.4.
 - 8. Lever design to match lockset trim.
 - 9. Lever design to be breakaway type.
 - 10. Provide hex dogging at non-rated doors.
 - 11. Provide exit devices properly sized for door width and height.
 - 12. Provide strike as recommended by manufacturer for application indicated.
 - 13. Provide UL (DIR) listed exit device assemblies for fire-rated doors and panic device assemblies for non-fire-rated doors.

2.05 LOCK CYLINDERS

- A. Manufacturers:
 - 1. BEST, dormakaba Group: www.bestaccess.com/#sle.
- B. Lock Cylinders: Provide key access on outside of each lock, unless otherwise indicated.
 - 1. Provide cams and/or tailpieces as required for locking devices.
 - 2. Within specific Door Sections, when provisions for lock cylinder are being referenced to this Section, provide specified lock cylinder and keyed to building keying system, unless otherwise indicated.
 - 3. Key System: Verify with Owner, interchangeable core keyway.
 - a. Best Access Systems
 - b. Key blanks available only from factory-direct sources, not available from after-market key blank manufacturers.
 - c. Initiate and conduct meeting(s) with Owner and key system representatives to determine system keyway(s), keybow styles, structure and degree of geographic exclusivity. Furnish Owner's written approval of the system; do not order keys or cylinders without written confirmation of actual requirements from the Owner.
 - d. Contractor will install permanent cylinders/cores.
- C. Keys:
 - 1. Existing factory registered master key system.
 - 2. Construction keying:
 - a. Furnish temporary keyed-alike cores.
 - b. Remove at substantial completion and install permanent cylinders/cores.
 - c. Demonstrate that construction key no longer operates.
 - d. Furnish 10 construction keys minimum.
 - e. Furnish 2 construction control keys.
 - 3. Furnish 2 Emergency keys per each Restroom Lock
 - 4. Permanent keys:
 - a. Use secured shipment direct from point of origination to Owner.
 - b. For estimate:
 - 1) 3 keys per change combination
 - 2) 5 master keys per group
 - 3) 5 grand-master keys
 - 4) 3 control keys.
 - c. For estimate: VKC stamping plus "DO NOT DUPLICATE".
 - d. Bitting List: use secured shipment direct from point of origination to Owner upon completion.

2.06 CYLINDRICAL LOCKS

- A. Manufacturers:
 - 1. Schlage, an Allegion brand; District standard: www.allegion.com/us/#sle.
- B. Cylindrical Locks (Bored): Comply with BHMA A156.2, Grade 1, 4000 Series.
 - 1. UL listed for A label and lesser class single doors up to 4 feet x 8 feet.
 - 2. Chassis: cylindrical design, corrosion-resistant plated cold-rolled steel, through-bolted.
 - 3. Locking Spindle: stainless steel, integrated spring and spindle design.

4. Latch Retractors: forged steel. Balance of inner parts: corrosion-resistant plated steel, or stainless steel.
5. Latchbolt: solid steel.
6. Backset: 2-3/4 inch unless otherwise indicated.
7. Lever Trim: accessible design, independent operation, spring-cage supported, minimum 2.00 inches clearance from lever mid-point to door face.
8. Strikes: 16 gage curved steel, bronze or brass with 1.00 inch deep box construction, lips of sufficient length to clear trim and protect clothing.
9. Lock Series and Design: Schlage ND series, "Sparta" design.
 - a. ANSI A156.2, 1994, Series 4000, Grade 1.
 - b. UL listed for A label and lesser class single doors up to 4 feet x 8 feet.
10. Accessibility: Require not more than 5 lb to retract the latchbolt or deadbolt, or both, per CBC Chapter 11B-404.2.7 and 11B-309.4
11. Accepted substitutions: None.

2.07 MORTISE LOCKS

- A. Manufacturers:
 1. Schlage, an Allegion brand; : www.allegion.com/us/#sle.
- B. Mortise Locks: Comply with BHMA A156.13, Grade 1, Security, 1000 Series.
 1. Latchbolt Throw: 3/4 inch, minimum.
 2. Deadbolt Throw: 1 inch, minimum.
 3. Backset: 2-3/4 inch unless otherwise indicated.
 4. Chassis: cold-rolled steel, handing field-changeable without disassembly.
 5. Universal lock case – 10 functions in one case.
 6. Floating mounting tabs automatically adjusts to fit a beveled door edge.
 7. Lever Trim: through-bolted, accessible design, cast lever or solid extruded bar type levers as scheduled. Filled hollow tube design unacceptable.
 8. Spindles: security design independent breakaway. Breakage of outside lever does not allow access to inside lever's hubworks to gain wrongful entry.
 9. Inside lever applied by screwless shank mounting – no exposed trim mount screws.
 10. Levers rotate up or down for ease of use.
 11. Furnish solid cylinder collars with wave springs. Wall of collar to cover rim of mortise cylinder.
 12. Turnpieces: accessible offset turn-lever design not requiring pinching or twisting motions to operate.
 13. Electric operation: Manufacturer-installed continuous duty solenoid.
 14. Strikes: 16 gage curved steel, bronze or brass with 1 inch deep box construction, lips of sufficient length to clear trim and protect clothing.
 15. Scheduled Lock Series and Design: Schlage L series, 17A design.
 16. Accessibility: Require not more than 5 lb to retract the latchbolt or deadbolt, or both, per CBC Chapter 11B-404.2.7 and 11B-309.4.
 17. Accepted substitutions: None.

2.08 DOOR PULLS AND PUSH PLATES

- A. Manufacturers:
 1. Ives, an Allegion brand; Basis of design: www.allegion.com/us/#sle.

2. Rockwood; an Assa Abloy Group company: www.assaabloydss.com/#sle.
 3. Trimco: www.trimcohardware.com/#sle.
 4. Substitutions: See Section 01 61 00 - Product Requirements.
- B. Door Pulls and Push Plates: Comply with BHMA A156.6.
1. Pull Type: Offset, unless otherwise indicated.
 2. Push Plate Type: Flat, with square corners, unless otherwise indicated.
 - a. Edges: Beveled, unless otherwise indicated.
 3. Material: Stainless steel, unless otherwise indicated.

2.09 CLOSERS

- A. Manufacturers; Surface Mounted:
1. LCN, an Allegion brand; : www.allegion.com/us/#sle.
- B. Closers: Comply with BHMA A156.4, Grade 1.
1. Type: Surface mounted to door.
 2. Provide door closer on each exterior door.
 3. Provide door closer on each fire-rated and smoke-rated door.
 - a. Spring hinges are not an acceptable self-closing device, unless otherwise indicated.
 4. Where an overlapping astragal is included on pairs of swinging doors, provide coordinator to ensure door leaves close in proper order.
 5. At corridor entry doors, mount closer on room side of door.
 6. At outswinging exterior doors, mount closer on interior side of door.
 7. Full rack-and-pinion type cylinder with removable non-ferrous cover and cast-iron body. Double heat-treated pinion shaft, single piece forged piston, chrome-silicon steel spring.
 8. ISO 2000 certified. Units stamped with date-of-manufacture code.
 9. Independent lab-tested 10,000,000 cycles.
 10. Non-sized, non-handed, and adjustable.
 11. Plates, brackets and special templating when needed for interface with particular header, door and wall conditions and neighboring hardware.
 12. 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 CBC Chapter 11B-404.2.9, local authority may increase the allowable pressure for fire doors to achieve positive latching, but not to exceed 15-pounds.
 13. Separate adjusting valves for closing speed, latching speed and backcheck, fourth valve for delayed action where scheduled.
 14. Door closers and gate closers shall be adjusted so that from an open position of 90 degrees, the time required to move the door to a position of 12 degrees from the latch is 5 seconds minimum.
 15. Extra-duty arms (EDA) at exterior doors scheduled with parallel arm units.
 16. Exterior door closers: tested to 100 hours of ASTM B117 salt spray test, furnish data on request.
 17. Exterior doors: seasonal adjustments not required for temperatures from 120 degrees F to -30 degrees F, furnish checking fluid data on request.
 18. Non-flaming fluid, will not fuel door or floor covering fires.
 19. Pressure Relief Valves (PRV) not permitted.

2.10 OVERHEAD STOPS AND HOLDERS

- A. Manufacturers:
 - 1. Rixson or Sargent; an Assa Abloy Group company: www.assaabloydss.com/#sle.
 - 2. Glynn-Johnson, an Allegion brand; Basis of design: www.allegion.com/us/#sle.
 - 3. Substitutions: See Section 01 61 00 - Product Requirements.
- B. Overhead Stops and Holders (Door Checks): Comply with BHMA A156.8, Grade 1.
 - 1. Provide stop for every swinging door, unless otherwise indicated.
 - 2. Stop is not required if positive stop feature is specified for door closer; positive stop feature of door closer is not an acceptable substitute for a stop, unless otherwise indicated.
 - 3. Non-plastic mechanisms and finished metal end caps.
 - 4. Field-changeable hold-open, friction and stop-only functions.

2.11 KICK PLATES

- A. Manufacturers:
 - 1. Ives, an Allegion brand; Basis of design: www.allegion.com/us/#sle.
 - 2. Rockwood; an Assa Abloy Group company: www.assaabloydss.com/#sle.
 - 3. Trimco: www.trimcohardware.com/#sle.
 - 4. Substitutions: See Section 01 61 00 - Product Requirements.
- B. Kick Plates: Provide along bottom edge of push side of every door with closer, except aluminum storefront and glass entry doors, unless otherwise indicated.
 - 1. Size: 10 inch high by 2 inch less door width (LDW) on push side of door.
 - 2. Metal Properties: Stainless steel.
 - a. Metal, Standard Duty: Thickness 0.05 inch, minimum.
 - 3. Edges: Beveled, on four sides unless otherwise indicated.
 - 4. Fasteners: Countersunk screw fasteners.

2.12 MOP PLATES

- A. Manufacturers:
 - 1. Ives, an Allegion brand: www.allegion.com/us/#sle.
 - 2. Ives, an Allegion brand; Basis of design: www.allegion.com/us/#sle.
 - 3. Trimco: www.trimcohardware.com/#sle.
 - 4. Substitutions: See Section 01 61 00 - Product Requirements.
- B. Mop Plates: Provide along bottom edge of push side of doors to provide protection from cleaning liquids and equipment damage to door surface.
 - 1. Size: 4 inch high by 1-1/2 inch less door width (LDW) on pull side and 2 inch LDW on push side of door.

2.13 FLOOR STOPS

- A. Manufacturers:
 - 1. Ives, an Allegion brand; Basis of design: www.allegion.com/us/#sle.
 - 2. Rockwood; an Assa Abloy Group company: www.assaabloydss.com/#sle.
 - 3. Trimco: www.trimcohardware.com/#sle.

4. Substitutions: See Section 01 61 00 - Product Requirements.
- B. Floor Stops: Comply with BHMA A156.16, Grade 1 and Resilient Material Retention Test as described in this standard.
 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. Material: Aluminum housing with rubber insert.

2.14 WALL STOPS

- A. Manufacturers:
 1. Ives, an Allegion brand; Basis of design: www.allegion.com/us/#sle.
 2. Rockwood; an Assa Abloy Group company: www.assaabloydss.com/#sle.
 3. Trimco: www.trimcohardware.com/#sle.
 4. Substitutions: See Section 01 61 00 - Product Requirements.
- B. Wall Stops: Comply with BHMA A156.16, Grade 1 and Resilient Material Retention Test as described in this standard.
 1. Type: Bumper, concave, wall stop.
 2. Material: Aluminum housing with rubber insert.

2.15 THRESHOLDS

- A. Manufacturers:
 1. Pemko; an Assa Abloy Group company: www.assaabloydss.com/#sle.
 2. National Guard Products, Inc: www.ngpinc.com/#sle.
 3. Zero International, Inc; Basis of design: www.zerointernational.com/#sle.
- B. Thresholds: Comply with BHMA A156.21.
 1. Provide threshold at each exterior door, unless otherwise indicated.
 2. Type: Flat surface.
 3. Material: Aluminum.
 4. Threshold Surface: Fluted horizontal grooves across full width.
 5. Field cut threshold to profile of frame and width of door sill for tight fit.
 6. Provide non-corroding fasteners at exterior locations.
 7. Comply with CBC Chapter 11B-404.2.5

2.16 WEATHERSTRIPPING AND GASKETING

- A. Manufacturers:
 1. Pemko; an Assa Abloy Group company: www.assaabloydss.com/#sle.
 2. National Guard Products, Inc: www.ngpinc.com/#sle.
 3. Zero International, Inc; Basis of design: www.zerointernational.com/#sle.
 4. Substitutions: See Section 01 61 00 - Product Requirements.
- B. Weatherstripping and Gasketing: Comply with BHMA A156.22.
 1. Head and Jamb Type: Adjustable.
 2. Door Sweep Type: Encased in retainer.

3. Material: Aluminum, with brush weatherstripping.
4. Provide weatherstripping on each exterior door at head, jambs, and meeting stiles of door pairs, unless otherwise indicated.
5. Provide door bottom sweep on each exterior door, unless otherwise indicated.
6. Provide sound-rated gasketing on doors indicated as "Sound-Rated", "Acoustical", or with "Sound Transmission Class (STC) rating"; fabricate as continuous gasketing, do not cut or notch gasketing material.

2.17 AUTOMATIC DOOR BOTTOMS

- A. Manufacturers:
 1. Pemko; an Assa Abloy Group company; Basis of design: www.assaabloydss.com/#sle.
 2. National Guard Products, Inc: www.ngpinc.com/#sle.
 3. Zero International, Inc: www.zerointernational.com/#sle.
 4. Substitutions: See Section 01 61 00 - Product Requirements.
- B. Provide automatic door bottom on doors indicated as "Sound-Rated", "Acoustical", or with "Sound Transmission Class (STC) rating".
- C. Design Requirements: Provide door bottoms which have been manufactured, fabricated and installed to meet the following design criteria:
 1. For automatic door bottoms, provide components with an aluminum case which surrounds a movable drop bar seal, actuated by a plunger which contacts the jamb as door is closing, forcing drop bar seal down against floor or threshold.
 2. Acoustical Performance: Provide specified STC rating per ASTM E90
 3. Smoke, Air Leakage: Recommended practice per NFPA 105.
 4. Provide performance obtained from test procedures UL 10B and UL 10C.
- D. Mount type: Mortise into door unless otherwise scheduled.

2.18 SILENCERS

- A. Manufacturers:
 1. Ives, an Allegion brand: www.allegion.com/us/#sle.
 2. Rockwood; an Assa Abloy Group company: www.assaabloydss.com/#sle.
 3. Substitutions: See Section 01 61 00 - Product Requirements.
- B. Silencers: Provide at equal locations on door frame to mute sound of door's impact upon closing.
 1. Single Door: Provide three on strike jamb of frame.
 2. Pair of Doors: Provide two on head of frame, one for each door at latch side.
 3. Material: Rubber, gray color.

2.19 FIRE DEPARTMENT LOCK BOX

- A. Manufacturers:
 1. Knox Company; Knox-Box Rapid Entry System, KnoxBox 3200: www.knoxbox.com/#sle.

B. Fire Department Lock Box:

1. Heavy-duty, surface mounted, solid stainless-steel box with hinged door and interior gasket seal; single drill resistant lock with dust covers and tamper alarm.
2. Capacity: Holds 10 keys.
3. Finish: Manufacturer's standard black.

2.20 FINISHES

A. Finishes: Provide door hardware of same finish, unless otherwise indicated.

1. Finish: 630; satin stainless steel, with stainless steel 300 series base material (former US equivalent US32D); BHMA A156.18.
2. Exceptions:
 - a. Where base material metal is specified to be different, provide finish that is an equivalent appearance in accordance with BHMA A156.18.
 - b. Hinges for Fire-Rated Doors: Steel base material with painted finish, in compliance with NFPA 80.
 - c. Door Closer Covers and Arms: Color as selected by Architect from manufacturer's standard colors unless otherwise indicated.
 - d. Aluminum Surface Trim and Gasket Housings: Anodized to match door panel finish, not other hardware, unless otherwise indicated.
 - e. Hardware for Aluminum Entrance Doors: Finished to match door panel finish, except at hand contact surfaces provide stainless steel with satin finish, unless otherwise indicated.

PART 3 EXECUTION

3.01 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.

3.02 EXAMINATION

- A. Verify that doors and frames are ready to receive this work; labeled, fire-rated doors and frames are properly installed, and dimensions are as indicated on shop drawings.
- B. Verify that electric power is available to power operated devices and of correct characteristics.
- C. Overhead stops: before installing, determine proposed locations of furniture items, fixtures, and other items to be protected by the overhead stop's action.

3.03 INSTALLATION

- A. Install hardware in accordance with manufacturer's instructions and applicable codes.

- B. Install hardware on fire-rated doors and frames in accordance with applicable codes and NFPA 80.
- C. Use templates provided by hardware item manufacturer.
- D. Door Hardware Mounting Heights: Distance from finished floor to center line of hardware item. As indicated in following list, unless noted otherwise on drawings.
 - 1. Mounting heights in compliance with ADA Standards:
 - a. Locksets: 40-5/16 inch.
 - b. Push Plates/Pull Bars: 42 inch.
 - c. Deadlocks (Deadbolts): 48 inch.
 - d. Exit Devices: 40-5/16 inch.
- E. Set exterior door thresholds with full-width bead of elastomeric sealant at each point of contact with floor providing a continuous weather seal; anchor thresholds with stainless steel countersunk screws.
- F. Locate floor stops no more than 4 inches from walls and not within paths of travel.
- G. Locate overhead stops for minimum 90 degrees at rest and for maximum allowable degree of swing.
- H. Drill pilot holes for fasteners in wood doors and/or frames.

3.04 FIELD QUALITY CONTROL

- A. Perform field inspection and testing under provisions of Section 01 40 00 - Quality Requirements.
- B. Provide an Architectural Hardware Consultant (AHC) to inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.

3.05 ADJUSTING

- A. Adjust work under provisions of Section 01 70 00 - Execution and Closeout Requirements.
- B. Adjust hardware for smooth operation.
- C. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.
- D. Hardware damaged by improper installation or adjustment methods: repair or replace to Owner's satisfaction.

3.06 CLEANING

- A. Clean finished hardware in accordance with manufacturer's written instructions after final adjustments have been made.
- B. Clean adjacent surfaces soiled by hardware installation.

- C. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

3.07 DEMONSTRATION:

- A. Demonstrate mechanical hardware and electrical, electronic and pneumatic hardware systems, including adjustment and maintenance procedures.

3.08 PROTECTION

- A. Protect finished Work under provisions of Section 01 70 00 - Execution and Closeout Requirements.
- B. Do not permit adjacent work to damage hardware or finish.

3.09 SCHEDULE OF FINISH HARDWARE

- A. Do not order material until submittal has been reviewed, stamped, and signed by Architect's door hardware consultant.
- B. 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.

Continues

Opt. #: OPT0303477-V1

Door Numbers	HwSet#
101A	01
101B	01
101C	01
101D	02
101E	02
101F	02
103A	03
103B	04
104A	04
105A	03
105B	06
105C	07
105D	08
106A	09
107A	10
108A	11
108B	12
109A	13
110A	14
111A	15
111B	16
112A	17
113A	18
114A	19
115A	20
116A	16
117A	21
117B	09
118A	18
119A	22
121A	23
123A	24
124B	18
125A	25
126A	26
127A	26
128A	18
129A	26
130A	26

Door Numbers	HwSet#
131A	18
132A	26
134A	27
134B	23

a

HARDWARE GROUP NO. 01

Provide each RU door(s) with the following:

1	SET	NOTE	ALL HARDWARE BY ROLL UP DOOR MANUFACTURER/SUPPLIER	B/O

HARDWARE GROUP NO. 02

Provide each FLD door(s) with the following:

1	EA	NOTE	ALL HARDWARE BY FOLDING DOOR MANUFACTURER/SUPPLIER	B/O

HARDWARE GROUP NO. 03

Provide each SGL door(s) with the following:

3	EA	HINGE	5BB1HW 4.5 X 4.5		630	IVE
1	EA	PASSAGE SET	L9010 06A		626	SCH
1	EA	OH STOP	100S ADJ		630	GLY
1	EA	SURFACE CLOSER	4011 H ST-1544		689	LCN
1	EA	MOUNTING PLATE	4020-18 SRT		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	DOOR SWEEP	39A		A	ZER
1	EA	THRESHOLD	547A-223 OR AS DETAILED		A	ZER

HARDWARE GROUP NO. 04

Provide each SGL door(s) with the following:

1	EA	CONT. HINGE	112XY		628	IVE
1	EA	ELEC CLASSROOM LOCK	CO-100-CY-70-KP-RHO-B 4B BATTERY OPERATED		626	SCE
1	EA	PERMANENT CORE	7 PIN SFIC CORE PER OWNER'S STANDARD		626	BES
1	EA	LOCK GUARD	LG12		600	IVE
1	EA	SURFACE CLOSER	4111 SCUSH		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	SET	GASKETING	429D-S		D	ZER
1	EA	DOOR SWEEP	39D		D	ZER
1	EA	THRESHOLD	547D-223 OR AS DETAILED		D	ZER

HARDWARE GROUP NO. 05 - Not Used

HARDWARE GROUP NO. 06

Provide each PR door(s) with the following:

6	EA	HINGE	5BB1HW 4.5 X 4.5		630	IVE
1	EA	CONST LATCHING BOLT	FB51P		630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2 AS REQ'D		626	IVE
1	EA	PASSAGE SET	L9010 06A		626	SCH
1	EA	SURFACE CLOSER	4111 SHCUSH		689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER
2	EA	DOOR SWEEP	39A		A	ZER
1	EA	ASTRAGAL	43SP		SP	ZER
1	EA	THRESHOLD	547A-223 OR AS DETAILED		A	ZER

HARDWARE GROUP NO. 07

Provide each SGL door(s) with the following:

3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	PUSH PLATE	8200 6" X 16"		630	IVE
1	EA	PULL PLATE	8302 10" 6" X 16"		630	IVE
1	EA	SURFACE CLOSER	4111 SHCUSH		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	DOOR SWEEP	39A		A	ZER
1	EA	THRESHOLD	547A-223 OR AS DETAILED		A	ZER

HARDWARE GROUP NO. 08

Provide each SGL door(s) with the following:

3	EA	HINGE	5BB1 4.5 X 4.5		630	IVE
1	EA	PASSAGE SET	L9010 06A		626	SCH
1	EA	OH STOP & HOLDER	90F		630	GLY
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	DOOR SWEEP	39A		A	ZER
1	EA	THRESHOLD	547A-223 OR AS DETAILED		A	ZER

HARDWARE GROUP NO. 09

Provide each SGL door(s) with the following:

4	EA	HINGE	5BB1HW SH 4.5 X 4.5 NRP		630	IVE
1	EA	ELEC CLASSROOM LOCK	CO-100-CY-70-KP-RHO-B 4B BATTERY OPERATED		626	SCE
1	EA	PERMANENT CORE	7 PIN SFIC CORE PER OWNER'S STANDARD		626	BES
1	EA	LOCK GUARD	LG12		600	IVE
1	EA	SURFACE CLOSER	4111 SHCUSH		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	SET	GASKETING	429D-S		D	ZER
1	EA	DOOR SWEEP	39D		D	ZER
1	EA	THRESHOLD	547D-223 OR AS DETAILED		D	ZER

HARDWARE GROUP NO. 10

Provide each SGL door(s) with the following:

3	EA	HINGE	5BB1HW 4.5 X 4.5		630	IVE
1	EA	PRIVACY INDICATOR LOCK	L9440 06A 06A L583-363 OS-OCC		626	SCH
1	EA	SURFACE CLOSER	4111 SCUSH		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER

HARDWARE GROUP NO. 11

Provide each SGL door(s) with the following:

3	EA	HINGE	5BB1HW 4.5 X 4.5		630	IVE
1	EA	FIRE EXIT HARDWARE	AX-98-L-F-06		626	VON
1	EA	SFIC RIM CYLINDER X TEMP CONST. CORE	80-159		626	SCH
1	EA	PERMANENT CORE	7 PIN SFIC CORE PER OWNER'S STANDARD		626	BES
1	EA	SURFACE CLOSER	4111 DEL SCUSH		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	DOOR BOTTOM	355AA		AA	ZER
1	EA	THRESHOLD	547A-223 OR AS DETAILED		A	ZER

HARDWARE GROUP NO. 12

Provide each SGL door(s) with the following:

3	EA	HINGE	5BB1HW 4.5 X 4.5		652	IVE
1	EA	PANIC HARDWARE	AX-98-L-BE-06		626	VON
1	EA	OH STOP	100S ADJ		630	GLY
1	EA	SURFACE CLOSER	4011 DEL		689	LCN
1	EA	MOUNTING PLATE	4020-18 SRT		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	DOOR BOTTOM	355AA		AA	ZER

HARDWARE GROUP NO. 13

Provide each SGL door(s) with the following:

3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	PASSAGE SET	L9010 06A		626	SCH
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	FLOOR STOP	FS436/FS438 AS REQ'D		626	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER

HARDWARE GROUP NO. 14

Provide each SGL door(s) with the following:

1	EA	CONT. HINGE	112XY		628	IVE
1	EA	PASSAGE SET	L9010 06A		626	SCH
1	EA	OH STOP	90S		630	GLY
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER

HARDWARE GROUP NO. 15

Provide each SGL door(s) with the following:

3	EA	HINGE	5BB1HW 4.5 X 4.5		652	IVE
1	EA	PUSH PLATE	8200 6" X 16"		630	IVE
1	EA	PULL PLATE	8302 10" 6" X 16"		630	IVE
1	EA	SURFACE CLOSER	4111 DEL SCUSH		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER

HARDWARE GROUP NO. 16

Provide each SGL door(s) with the following:

3	EA	HINGE	5BB1HW 4.5 X 4.5		652	IVE
1	EA	ELEC CLASSROOM LOCK	CO-100-CY-70-KP-RHO-B 4B BATTERY OPERATED		626	SCE
1	EA	PERMANENT CORE	7 PIN SFIC CORE PER OWNER'S STANDARD		626	BES
1	EA	SURFACE CLOSER	4111 EDA		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	FLOOR STOP	FS436/FS438 AS REQ'D		626	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER

HARDWARE GROUP NO. 17

Provide each SGL door(s) with the following:

3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	OFFICE W/SIM RETRACT	L9056HD 06A L583-363		626	SCH
1	EA	PERMANENT CORE	7 PIN SFIC CORE PER OWNER'S STANDARD		626	BES
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	FLOOR STOP	FS436/FS438 AS REQ'D		626	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER

HARDWARE GROUP NO. 18

Provide each SGL door(s) with the following:

3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	PRIVACY INDICATOR LOCK	L9440 06A 06A L583-363 OS-OCC		626	SCH
1	EA	SURFACE CLOSER	4011		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER

HARDWARE GROUP NO. 19

Provide each SGL door(s) with the following:

3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	ELEC CLASSROOM LOCK	CO-100-CY-70-KP-RHO-B 4B BATTERY OPERATED		626	SCE
1	EA	PERMANENT CORE	7 PIN SFIC CORE PER OWNER'S STANDARD		626	BES
1	EA	SURFACE CLOSER	4011 H		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	FLOOR STOP	FS436/FS438 AS REQ'D		626	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER

HARDWARE GROUP NO. 20

Provide each SGL door(s) with the following:

1	EA	CONT. HINGE	112XY		313AN	IVE
1	EA	ELEC CLASSROOM LOCK	CO-100-CY-70-KP-RHO-B 4B BATTERY OPERATED		643e	SCE
1	EA	PERMANENT CORE	7 PIN SFIC CORE PER OWNER'S STANDARD		606	BES
1	EA	SURFACE CLOSER	4111 EDA		695	LCN
1	EA	MOUNTING PLATE	4110-18 AS REQ'D		695	LCN
1	EA	BLADE STOP SPACER	4110-61 SRT AS REQUIRED		695	LCN
1	EA	FLOOR STOP	FS441		643E/716	IVE
1	EA	SEAL	WEATHER SEALS BY DOOR MANUFACTURER/SUPPLIER			B/O
1	EA	DOOR SWEEP	8192D		D	ZER

HARDWARE GROUP NO. 21

Provide each SGL door(s) with the following:

3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	OFFICE W/SIM RETRACT	L9056HD 06A L583-363		626	SCH
1	EA	PERMANENT CORE	7 PIN SFIC CORE PER OWNER'S STANDARD		626	BES
1	EA	SURFACE CLOSER	4111 HEDA		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	FLOOR STOP	FS436/FS438 AS REQ'D		626	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER

HARDWARE GROUP NO. 22

Provide each SGL door(s) with the following:

3	EA	HINGE	5BB1HW 4.5 X 4.5		652	IVE
1	EA	ELEC CLASSROOM LOCK	CO-100-CY-70-KP-RHO-B 4B BATTERY OPERATED		626	SCE
1	EA	PERMANENT CORE	7 PIN SFIC CORE PER OWNER'S STANDARD		626	BES
1	EA	OH STOP	100S ADJ		630	GLY
1	EA	SURFACE CLOSER	4011 H ST-1544		689	LCN
1	EA	MOUNTING PLATE	4020-18 SRT		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	THRESHOLD	547A-223 OR AS DETAILED		A	ZER

HARDWARE GROUP NO. 23

Provide each PR door(s) with the following:

2	EA	CONT. HINGE	112XY		313AN	IVE
1	EA	CONST LATCHING BOLT	FB51P		630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2 AS REQ'D		613	IVE
1	EA	ELEC CLASSROOM LOCK	CO-100-CY-70-KP-RHO-B 4B BATTERY OPERATED		643e	SCE
1	EA	PERMANENT CORE	7 PIN SFIC CORE PER OWNER'S STANDARD		606	BES
1	EA	COORDINATOR	COR X FL		315AN	IVE
2	EA	MOUNTING BRACKET	MB1/MB2 AS REQUIRED		BLK	IVE
2	EA	SURFACE CLOSER	4111 SCUSH		695	LCN
2	EA	MOUNTING PLATE	4110-18 AS REQ'D		695	LCN
2	EA	BLADE STOP SPACER	4110-61 SRT AS REQUIRED		695	LCN
2	EA	FLOOR STOP	FS441		643E/7 16	IVE
2	EA	SEAL	WEATHER SEALS BY DOOR MANUFACTURER/SUPPLIER			B/O
2	EA	DOOR SWEEP	8192D		D	ZER
1	EA	THRESHOLD	547D-223 OR AS DETAILED		D	ZER
1	EA	HEADER SIGN	20-0255-IP OR 20-0256-IP AS REQ'D			ADA

HARDWARE GROUP NO. 24

Provide each SGL door(s) with the following:

3	EA	HINGE	5BB1HW 4.5 X 4.5		652	IVE
1	EA	PASSAGE SET	L9010 06A		626	SCH
1	EA	OH STOP	100S ADJ		630	GLY
1	EA	SURFACE CLOSER	4011 H ST-1544		689	LCN
1	EA	MOUNTING PLATE	4020-18 SRT		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER

HARDWARE GROUP NO. 25

Provide each SGL door(s) with the following:

3	EA	HINGE	5BB1HW 4.5 X 4.5		652	IVE
1	EA	OFFICE W/SIM RETRACT	L9056HD 06A L583-363		626	SCH
1	EA	PERMANENT CORE	7 PIN SFIC CORE PER OWNER'S STANDARD		626	BES
1	EA	OH STOP	100S ADJ		630	GLY
1	EA	SURFACE CLOSER	4011 ST-1544		689	LCN
1	EA	MOUNTING PLATE	4020-18 SRT		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER
1	SET	SEAL	INTUMESCENT SEALS BY DOOR MANUFACTURER/SUPPLIER			B/O
1	EA	THRESHOLD	547A-223 OR AS DETAILED		A	ZER

HARDWARE GROUP NO. 26

Provide each SGL door(s) with the following:

3	EA	HINGE	5BB1HW 4.5 X 4.5		652	IVE
1	EA	OFFICE W/SIM RETRACT	L9056HD 06A L583-363		626	SCH
1	EA	PERMANENT CORE	7 PIN SFIC CORE PER OWNER'S STANDARD		626	BES
1	EA	SURFACE CLOSER	4011		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	FLOOR STOP	FS436/FS438 AS REQ'D		626	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	THRESHOLD	547A-223 OR AS DETAILED		A	ZER

HARDWARE GROUP NO. 27

Provide each SGL door(s) with the following:

3	EA	HINGE	5BB1HW 4.5 X 4.5		652	IVE
1	EA	PASSAGE SET	L9010 06A		626	SCH
1	EA	SURFACE CLOSER	4111 EDA		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	FLOOR STOP	FS436/FS438 AS REQ'D		626	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER

END OF SECTION

END OF SECTION

Section 08 80 00

Glazing

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. .
- B. Glazing compounds and accessories.

1.02 RELATED REQUIREMENTS

- A. Section .
- B. Section : Glazed .
- C. Section : Glazed lites in doors.
- D. Section : Glazed lites in doors.
- E. Section : Glazing furnished by storefront manufacturer.
- F. Section 08 51 13 - Aluminum Windows: Glazed windows.
- G. Section .
- H. Section 10815 - Glass Tub and Shower Enclosures

1.03 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.
- B. ASTM C1036 - Standard Specification for Flat Glass; 2011.
- C. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.
- D. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.

1.04 PERFORMANCE REQUIREMENTS

- A. Provide glass and glazing materials for continuity of building enclosure vapor retarder and air barrier:
 - 1. In conjunction with vapor retarder and joint sealer materials described in other sections.

2. To maintain a continuous air barrier and vapor retarder throughout the glazed assembly from glass pane to heel bead of glazing sealant.

1.05 SUBMITTALS

- A. See Section , for submittal procedures.
- B. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.
- C. Samples: Submit two samples 12 by 12 inch in size of glass and plastic units, showing coloration and design of glass units, showing coloration.

1.06 QUALITY ASSURANCE

- A. Perform Work in accordance with for .
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum years experience.

1.07 WARRANTY

- A. See Section , for additional warranty requirements.
- B. Sealed Insulating Glass Units: Provide a year warranty to include coverage for seal failure, interpane dusting or misting, including replacement of failed units.

PART 2 PRODUCTS

2.01 GLASS MATERIALS

- A. Manufacturers:
 1. AFG Industries, Inc: www.afgglass.com.
 2. Pilkington Building Products North America: www.pilkington.com.
 3. PPG Industries, Inc: www.ppg.com.
 4. Substitutions: Refer to Section 01 60 00 - Product Requirements.
- B. Clear Float Glass (Type PPG): Clear, annealed.
 1. Comply with ASTM C 1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select).
 2. 6 mm thick.
 3. Total Thickness: Single Pane
 4. Location: All interior Glazing
- C. Safety Glass : Clear; fully tempered with horizontal tempering:
 1. Color and Thickness:
 - a. Interior: To match Clear Float Glass
 - b. Exterior: To match Low E Glass
 2. Comply with 16 CFR 1201 test requirements for Category II.

3. 6 mm minimum thick.
 4. Provide this type of glazing in the locations required by code.
 - a. Glazed lites in doors .
 - b. Glazed sidelights to doors.
- D. Low E Glass (Type PPG Solarban 60 Solarbronze +Clear): Float type, annealed, in bronze color.
1. Visible light transmittance of 42 percent, UV light transmittance of 8 percent, shading coefficient of .31.
 2. U-Value: Winter Nighttime: .29, Summer Daytime:.27
 3. Visible light reflectance of 7 percent.
 4. 6 mm minimum thick.
 5. Total thickness: Double Pane 1" thick
 6. Location: All Exterior Glazing (Including Apparatus Bay Doors)
- E. Low E Glass (Type PPG Solarban 60 "Clear+Clear"): Float type, annealed, clear.
1. Visible light transmittance of 70 percent, UV light transmittance of 19 percent, shading coefficient of .44.
 2. U-Value: Winter Nighttime: .29, Summer Daytime:.27
 3. Visible light reflectance of 11 percent.
 4. 6 mm minimum thick.
 5. Total thickness: Double Pane 1" thick
 6. Location: All Exterior Glazing (Including Apparatus Bay Doors)

2.02 SEALED INSULATING GLASS UNITS

- A. Manufacturers:
1. Any of the manufacturers specified for float glass.
 2. Substitutions:
- B. Sealed Insulating Glass Units: Types as indicated.
1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
 2. Edge Spacers: , corners.
 3. Edge Seal:
 4. Purge interpane space with dry air.

2.03 GLAZING ACCESSORIES

- A. Setting Blocks: , Shore A durometer hardness. Length of of glazing or minimum x width of glazing rabbet space minus x height to suit glazing method and pane weight and area.
- B. Spacer Shims: , Shore A durometer hardness. Minimum long x one half the height of the glazing stop x thickness to suit application.
- C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound; hardness range of 5 to 30 cured Shore A durometer; coiled on release paper; black color.
- D. Glazing : Resilient extruded shape to suit glazing channel retaining slot; color.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 INSTALLATION - EXTERIOR/INTERIOR DRY METHOD (GASKET GLAZING)

- A. Place setting blocks at points with edge block no more than from corners.
- B. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
- C. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.03 CLEANING

- A. Remove glazing materials from finish surfaces.
- B. Remove labels after Work is complete.
- C. Clean glass and adjacent surfaces.

END OF SECTION

Section 08 83 00

Mirrors

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Glass mirrors.

1.02 RELATED REQUIREMENTS

- A. Section 06 20 00 - Finish Carpentry: Wood mirror frames.

1.03 REFERENCE STANDARDS

- A. ASTM C1036 - Standard Specification for Flat Glass; 2011.
- B. GANA (GM) - GANA Glazing Manual; 2009.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data on Mirror Types: Submit structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
- C. Samples: Submit two samples, 12 x 12 inch in size, illustrating mirrors design, edging, and coloration.
- D. Warranty: Submit manufacturer warranty and ensure that forms have been completed in County's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA Glazing Manual for glazing installation methods.
- B. Fabricate, store, transport, receive, install, and clean mirrors in accordance with manufacturer's recommendations.

1.06 FIELD CONDITIONS

- A. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.07 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

- B. Provide five year manufacturer warranty for reflective coating on mirrors and replacement of same.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Mirrors:
 - 1. Binswanger Mirror/ACI Distribution: www.binswangerglass.com.
 - 2. Lenoir Mirror Co: www.lenormirror.com.

2.02 MATERIALS

- A. Mirror Design Criteria: Select materials and/or provide supports as required to limit mirror material deflection to 1/200, or to the flexure limit of glass, with full recovery of glazing materials, whichever is less.

2.03 ACCESSORIES

- A. Mirror Attachment Accessories: Stainless steel clips.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces of mirror frames or recesses are clean, free of obstructions, and ready for installation of mirrors.

3.02 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.

3.03 INSTALLATION

- A. Install mirrors in accordance with manufacturer's recommendations.
- B. Set mirrors plumb and level, and free of optical distortion.
- C. Set mirrors with edge clearance free of surrounding construction including countertops or backsplashes.
- D. Frameless Mirrors: Set mirrors with clips, and anchor rigidly to wall construction.

3.04 CLEANING

- A. Remove labels after work is complete.

- B. Clean mirrors and adjacent surfaces.

END OF SECTION

Section 08 88 37
Glazing with Integral Louvers

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Insulating glazing units with integral louvers.

1.02 RELATED REQUIREMENTS

- A. 08 43 13 - Aluminum-Framed Storefronts

1.03 REFERENCE STANDARDS

- A. AAMA 611 - Specification for Anodized Architectural Aluminum; 2024.
- B. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; 2010, with 2013 Supplements and Errata.
- C. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- D. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.
- E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.
- F. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.
- G. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2002 (Reapproved 2013).
- H. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.
- I. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2023).
- J. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2016.
- K. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.
- L. GANA (SM) - GANA Sealant Manual; 2008.

- M. NFRC 100 - Procedure for Determining Fenestration Product U-factors; 2014.
- N. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2014.
- O. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems; 2023.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data:
 - 1. Glazing: Manufacturer's structural, physical, and environmental characteristics, size limitations, special handling, and installation requirements.
- C. Samples:
 - 1. one glazing units, 8-1/2 by 13-1/2 inches.
- D. Specimen warranty.

1.05 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer Warranty: Provide 10-year manufacturer warranty for exterior glazing units against malfunction, mechanism failure and premature wear of internal parts, and material obstruction of glass units by dust or film formation due to failure of hermetic seal. Complete forms in County's name and register with manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. UniceL Architectural Corp; Vision Control: www.uniceLarchitectural.com/#sle. (Basis of Design)
- B. ODL Inc.; 1" blinds + glass : odl.com
- C. Alpha Commercial Blinds; 5/8" Sealed Blind Unit : alphacommercialblinds.com

2.02 PERFORMANCE REQUIREMENTS

- A. Provide type and thickness of glazing assemblies to support assembly dead loads and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
 - 1. Design Pressure: Calculated in accordance with ASCE 7.
 - 2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.

3. Seismic Loads: Design and size glazing components to withstand seismic loads and sway displacement in accordance with ASCE 7.
 4. Provide glass edge support system sufficiently stiff to limit lateral deflection of supported glass edges maximum 1/175 of glass lengths under specified design load.
- B. Air Leakage: 0.02 cfm/sq ft maximum leakage when tested at 6.27 psf pressure difference in accordance with ASTM E283/E283M.
- C. Water Penetration: No water penetration after 15 minutes of static pressure when tested in accordance with ASTM E331 at differential of 42 psf.
- D. Thermal and Optical Performance: Provide exterior glazing products with performance properties in accordance with manufacturer's published data as determined by the following procedures:
1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW computer program.
 2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW computer program.
 3. Solar Optical Properties: Comply with NFRC 300 test method.

2.03 INSULATING GLAZING UNITS

- A. Insulating Glazing Units:
1. Durability: Comply with ASTM E2190, certified by independent testing agency.
 2. Edge Seals:
 - a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal between spacer and glass panes, and silicone sealant as secondary seal around perimeter.
 - b. Color: Black.
 3. Refer to Section 08 80 00 - Glazing for glazing.

2.04 LOUVER OPERATORS

- A. Manual Operation:
1. Quick Glide, ADA compliant sliding control
 2. Single sided operation: interior

2.05 GLAZING COMPOUNDS

- A. Type GC-1 - Silicone Sealant: Two-component, low modulus, nonsag; comply with ASTM C920 Type M, Grade NS, Class 25.
- B. Sealant Backing: ASTM C1330, Type O.

2.06 MATERIALS

- A. Float Glass:
1. Refer to 08 80 00 - Glazing
- B. Aluminum: ASTM B221 and ASTM B221M.

2.07 FINISHES

- A. Class II Color Anodized Finish: AAMA 611 AA-M12C22A34, minimum 0.4 mil, 0.0004 inch thick.
 - 1. Color: To match door

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify opening sizes and tolerances comply with drawings.
- B. Verify minimum face and edge clearances.
- C. Ensure glazing channels, weeps, and recesses are clean and free of obstructions.
- D. Verify readiness of support framing to receive glazing units.
- E. Verify effective sealing of joints between glass framing members.
- F. Report unsatisfactory conditions to Architect. Correct unsatisfactory conditions before starting work.

3.02 INSTALLATION

- A. Install glazing in accordance with manufacturer's instructions.
- B. Install sealant backing before applying sealant.
- C. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.
- D. Do not exceed manufacturer's edge pressure limits around perimeter of glass lites.

3.03 CLEANING

- A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.
- B. Remove excess glazing materials from finished surfaces immediately after application. Use cleaners recommended by manufacturer.
- C. Remove temporary labels immediately after glazing installation.
- D. Clean glass on both exposed surfaces maximum 4 days before Date of Substantial Completion in accordance with manufacturer's instructions.

3.04 PROTECTION

- A. After installation, mark pane with "X" using removable tape or paste.

- B. Protect glazing from subsequent construction operations.
- C. Remove and replace glass damaged during construction.

END OF SECTION

Section 08 91 00

Louvers

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Louvers, frames, and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 09 91 13 - Exterior Painting: Field painting.

1.03 REFERENCE STANDARDS

- A. AMCA 511 - Certified Ratings Program for Air Control Devices; 2010.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- C. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- D. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.
- C. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, and tolerances; head, jamb and sill details; blade configuration, screens, blank-off areas required, and frames.
- D. Samples: Submit two samples 2 by 2 inches in size illustrating finish and color of exterior and interior surfaces.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of documented experience.

1.06 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Provide five year manufacturer's warranty against distortion, metal degradation, and connection failures of louver components.
 - 1. Finish: Include twenty year coverage against degradation of exterior finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Louvers:
 - 1. Airolite Company, LLC: www.airolite.com.

2.02 LOUVERS

- A. Louvers: Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified in accordance with AMCA 511.
- B. Stationary Louvers: Horizontal blade, formed galvanized steel sheet construction, with intermediate mullions matching frame.
 - 1. Blades: Straight.
 - 2. Frame: 4 inches deep, channel profile; corner joints mitered and , with continuous recessed caulking channel each side.
 - 3. Steel Thickness, Galvanized: Frame 16 gauge, 0.0598 inch minimum base metal; blades 16 gauge, 0.0598 inch minimum base metal.
 - 4. Steel Finish: Superior performing organic coating, finished after fabrication.

2.03 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Steel Sheet: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.

2.04 ACCESSORIES

- A. Flashings: Of same material as louver frame, formed to required shape, single length in one piece per location.
- B. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that prepared openings and flashings are ready to receive this work and opening dimensions are as indicated on shop drawings.

3.02 INSTALLATION

- A. Install louver assembly in accordance with manufacturer's instructions.
- B. Install louvers level and plumb.
- C. Install flashings and align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.
- D. Secure louver frames in openings with concealed fasteners.
- E. Coordinate with installation of mechanical ductwork.

3.03 CLEANING

- A. Strip protective finish coverings.
- B. Clean surfaces and components.

END OF SECTION

**Section 09 21 16
Gypsum Board Assemblies**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Metal stud wall framing.
- B. Metal channel ceiling framing.
- C. Acoustic insulation.
- D. Cementitious backing board.
- E. Gypsum wallboard.
- F. Joint treatment and accessories.
- G. Textured finish system.

1.02 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Building framing and sheathing.
- B. Section 06 10 00 - Rough Carpentry: Wood blocking product and execution requirements.
- C. Section 07 21 00 - Board and Batt Insulation: Acoustic insulation.
- D. Section 09 30 00 - Tiling: Tile backing board.

1.03 REFERENCE STANDARDS

- A. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2015.
- B. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2014.
- C. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2012.
- D. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2020.
- E. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2013.

- F. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2015.
- G. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2014.
- H. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base; 2014a.
- I. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel; 2013.
- J. ASTM C1325 - Specification for Non-Asbestos Fiber-Mat Reinforced Cementitious Backer Units; 2014.
- K. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2014.
- L. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2012.
- M. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026.
- N. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.
- O. ASTM E413 - Classification for Rating Sound Insulation; 2010.
- P. GA-214 - Recommended Levels of Gypsum Board Finish; Gypsum Association; 1996.
- Q. GA-216 - Application and Finishing of Gypsum Board; 2013.
- R. GA-600 - Fire Resistance Design Manual; 2015.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on gypsum board, accessories, and joint finishing system.
- C. Test Reports: For stud framing products that do not comply with ASTM C645 or ASTM C754, provide independent laboratory reports showing maximum stud heights at required spacings and deflections.

1.05 QUALITY ASSURANCE

- A. Perform in accordance with ASTM C 840.

- B. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum 5 years of experience.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
- B. Interior Partitions: Provide completed assemblies with the following characteristics:
 - 1. Acoustic Attenuation: STC of 45-49 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.

2.02 BOARD MATERIALS

- A. Manufacturers - Gypsum-Based Board:
 - 1. American Gypsum Company: www.americangypsum.com.
 - 2. Georgia-Pacific Gypsum: www.gpgypsum.com.
 - 3. National Gypsum Company: www.nationalgypsum.com.
 - 4. PABCO Gypsum: www.pabco gypsum.com.
 - 5. USG Corporation: www.usg.com.
- B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
 - 1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
 - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - a. Mold resistant board is required at areas exposed to moisture and at the Apparatus Bay ceilings and walls..
 - 1) Provide resilient furring channels at ceilings at 12" O.C. for attachment of mold-resistant board.
 - 3. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
 - 4. Thickness:
 - a. Vertical Surfaces: 5/8 inch.
 - b. Ceilings: 5/8 inch.
- C. Impact Resistant Wallboard:
 - 1. Application: High-traffic areas indicated.
 - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - 3. Type: Fire-resistance-rated Type X, UL or WH listed.
 - 4. Thickness: 5/8 inch.
 - 5. Edges: Tapered.
- D. Backing Board For Wet Areas:
 - 1. Application: Surfaces behind tile in wet areas including shower surrounds and tile wall wainscots and shower surrounds and tile wall wainscots.
 - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - 3. Glass Mat Faced Board: Coated glass mat water-resistant gypsum backing panel as defined in ASTM C1178/C1178M.

- a. Regular Type: Thickness 1/2 inch.
 - b. Fire-Resistance-Rated Type: Type X core, thickness 5/8 inch.
- E. Ceiling Board: Special sag resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
 - 1. Application: Ceilings, unless otherwise indicated.
 - 2. Thickness: 1/2 inch.
 - 3. Edges: Tapered.
- F. Gypsum Wallboard: ASTM C 1396/C 1396M. Sizes to minimize joints in place; ends square cut.
 - 1. Regular Type:
 - a. Application: Use for vertical surfaces, unless otherwise indicated.
 - b. Thickness: 5/8 inch.
 - c. Edges: Tapered.
 - 2. Type X: Fire resistant, UL or WH rated.
 - a. Application: Where required for fire-rated assemblies, unless otherwise indicated.
 - b. Thickness: 5/8 inch.
 - c. Edges: Tapered.
 - 3. Abuse-Resistant Type: Gypsum wallboard especially formulated for increased impact resistance, with enhanced gypsum core and heavy duty face and back paper.
 - a. Application: High-traffic areas indicated.
 - b. Thickness: 5/8 inch.
 - c. Edges: Tapered.

2.03 GYPSUM BOARD ACCESSORIES

- A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness: 5-1/2 inch.
- B. Finishing Accessories: ASTM C1047, extruded aluminum alloy (6063 T5) or galvanized steel sheet ASTM A924/A924M G90, unless noted otherwise.
 - 1. Types: As detailed or required for finished appearance.
- C. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
 - 1. Fiberglass Tape: 2 inch wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
 - 2. Joint Compound: Setting type, field-mixed.
- D. Textured Finish Materials: Latex-based compound; plain.
- E. Screws: ASTM C 1002; self-piercing tapping type.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION

- A. Suspended Ceilings and Soffits: Space framing and furring members as indicated.
- B. Standard Wall Furring: Install at concrete walls scheduled to receive gypsum board, not more than 4 inches from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 24 inches on center.
 - 1. Orientation: Horizontal.
 - 2. Spacing: At 16 inches on center.
- C. Blocking: Install wood blocking for support of:
 - 1. Wall-mounted cabinets.
 - 2. Plumbing fixtures.
 - 3. Toilet partitions.
 - 4. Toilet accessories.

3.03 ACOUSTIC ACCESSORIES INSTALLATION

- A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
- B. Acoustic Sealant: Install in accordance with manufacturer's instructions.

3.04 BOARD INSTALLATION

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
- C. Fire-Resistance-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.

3.05 INSTALLATION OF TRIM AND ACCESSORIES

- A. Corner Beads: Install at external corners, using longest practical lengths.
- B. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.06 JOINT TREATMENT

- A. Glass Mat Faced Gypsum Board and Exterior Glass Mat Faced Sheathing: Use fiberglass joint tape, embed and finish with setting type joint compound.
- B. Paper Faced Gypsum Board: Use fiberglass joint tape, bedded with ready-mixed vinyl-based joint compound and finished with ready-mixed vinyl-based joint compound.
- C. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:

1. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish and other areas specifically indicated.
 2. Level 3: Walls to receive textured wall finish.
 3. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
 4. Level 1: Wall areas above finished ceilings, whether or not accessible in the completed construction.
- D. Finish gypsum board in scheduled areas in accordance with levels defined in ASTM C 840 and as scheduled below.
- E. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
1. Feather coats of joint compound so that camber is maximum 1/32 inch.
- F. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

3.07 TEXTURE FINISH

- A. Apply finish texture coating by means of spraying apparatus in accordance with manufacturer's instructions and to match approved sample.

3.08 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

3.09 FINISH LEVEL SCHEDULE

- A. Level 1: Above finished ceilings concealed from view.
- B. Level 2: Utility areas and areas behind cabinetry.
- C. Level 4: Walls and ceilings scheduled to receive flat or eggshell paint finish.
- D. Level 5: Walls and ceilings scheduled to receive semi-gloss or gloss paint finish.

End of Section

Section 09 22 36

Lath

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Metal lath for cement plaster.
- B. Expansion and control joints
- C. Screeds

1.02 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry.
- B. Section 07 25 00 - Weather Barriers.
- C. Section 09 24 00 - Cement Plastering.

1.03 REFERENCE STANDARDS

- A. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 2009a (Reapproved 2014).
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- C. ASTM C841 - Standard Specification for Installation of Interior Lathing and Furring; 2003 (Reapproved 2013).
- D. ASTM C847 - Standard Specification for Metal Lath; 2014a.
- E. ASTM C933 - Standard Specification for Welded Wire Lath; 2014.
- F. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2015.
- G. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2014.
- H. ASTM C1032 - Standard Specification for Woven Wire Plaster Base; 2014.
- I. ASTM C1063 - Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster; 2016a.

- J. ASTM C1861 - Standard Specification for Lathing and Furring Accessories, and Fasteners, for Interior and Exterior Portland Cement-Based Plaster; 2020.
- K. ASTM F1667/F1667M - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples; 2021a.
- L. ICC-ES AC70 - Acceptance Criteria for Fasteners Power Driven into Concrete, Steel and Masonry Elements; ICC Evaluation Service, Inc.; 2013.
- M. TSIB TB 60.160 - Lath & Plaster Control Joints Over Continuous Lath; 2021.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on furring and lathing components, structural characteristics, material limitations, and finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Metal Lath and Accessories:
 - 1. Alabama Metal Industries Corporation: www.amico-lath.com/#sle.
 - 2. CEMCO: www.cemcosteel.com/#sle.
 - 3. MarinoWARE: www.marinoware.com/#sle.
 - 4. Structa Wire: www.structawire.com/#sle.

2.02 LATH

- A. Diamond Mesh Metal Lath: ASTM C847, galvanized; self-furring.
 - 1. Weight: 3.4 lb/sq yd.
 - 2. Backed with treated paper.
- B. Ribbed Metal Lath: ASTM C847, galvanized; 3/8 inch thick.
 - 1. Weight: To suit application and as specified in ASTM C841 or ASTM C1063 for framing spacing.
- C. Self Furring Welded Wire Lath: ASTM C933; galvanized; with 11/16 inch by 1 1/2 inch openings, of 17 gauge by 16 gauge cold rolled wire.
 - 1. Weight: 1.95 lbs per square yard.
- D. Corner Mesh: ASTM C1063; formed sheet steel, minimum 26 gauge, 0.0179 inch, perforated flanges shaped to permit complete embedding in plaster, minimum 2-inch size; G60 galvanized coating in accordance with ASTM A653/A653M.
- E. Strip Mesh: Expanded metal lath, same weight as lath, 2 inch wide by 24 inch long; same finish as lath.

- F. Beads, Screeds, Joint Accessories, and Other Trim: Depth governed by plaster thickness, and maximum possible lengths.
 - 1. Material: Formed galvanized sheet steel, expanded metal flanges.
 - 2. Casing Beads: Square edges.
 - a. Products:
 - 1) Alabama Metal Industries Corporation; X-66: www.amicoglobal.com/#sle.
 - 2) CEMCO; #66: www.cemcosteel.com/#sle.
 - 3. Corner Beads: Radiused corners.
 - a. Products:
 - 1) Alabama Metal Industries Corporation; X-1: www.amicoglobal.com/#sle.
 - 2) CEMCO; 1-A: www.cemcosteel.com/#sle.
 - 4. Base Screeds:
 - a. Material: Galvanized steel, ASTM A653/A653M, with G90 zinc coating; minimum 26-gauge, 0.0179-inch thick base steel.
 - b. Products:
 - 1) Alabama Metal Industries Corporation; #7: www.amicoglobal.com/#sle.
 - 2) CEMCO; #7: www.cemcosteel.com/#sle.
 - 5. Control Joints: Accordion profile with factory-installed protective tape, 2 inch flanges.
 - a. Products:
 - 1) Alabama Metal Industries Corporation; XJ-15: www.amicoglobal.com/#sle.
 - 2) CEMCO; XJ-15: www.cemcosteel.com/#sle.

2.03 FURRING ACCESSORIES

- A. Tie Wire: Comply with ASTM C1861.
 - 1. Applications:
 - a. Exterior applications; used for attaching lathing and furring accessories.
 - 2. Carbon Steel Wire: ASTM A641/A641M; annealed, Class 1, zinc-coated galvanized.
 - a. Wire Diameter: 18 gauge, 0.0475 inch uncoated.

2.04 ACCESSORIES

- A. Nails and Staples: Comply with ASTM C1861 and ASTM F1667/F1667M.
 - 1. Applications: Fastening into wood studs and wood joists.
 - 2. Comply with ASTM C1861 for nail type and embedment depth.
- B. Screws: Comply with ASTM C1861 and:
 - 1. ASTM C1002 for fastening metal plaster bases to wood studs.
 - 2. ASTM C1002 for fastening metal plaster bases to steel studs less than 0.033 inch thick.
 - 3. ASTM C954 for fastening metal plaster bases to steel studs from 0.033 to 0.112 inch thick.
- C. Power-Actuated Fasteners: Provide fasteners meeting requirements of ICC-ES AC70.
 - 1. Applications: Fastening furring accessories into solid bases.
 - 2. Comply with ASTM C1861 for fastener type and embedment depth.
- D. Fastener Materials:
 - 1. Steel with corrosion-resisting coating or plating.

- E. Fasteners in Contact with Preservative-Treated and Fire-Retardant-Treated Wood.
 - 1. Comply with requirements of applicable code for corrosion resistance.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that substrates are ready to receive work and conditions are suitable for application.
- C. For exterior plaster and stucco on stud walls, verify that water-resistive barrier has been installed over sheathing substrate completely and correctly; see Section 07 25 00.
- D. Do not begin until unacceptable conditions have been corrected.
- E. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 INSTALLATION - GENERAL

- A. Install lathing and furring for exterior and interior cement plaster in accordance with ASTM C1063 and manufacturer's evaluation report for alternative installation requirements.
- B. Do not seal or block rainscreen at top or bottom of installation. Leave a minimum 3/8" (10 mm) air gap open for ventilation and proper performance of the wall system.

3.03 CONTROL AND EXPANSION JOINT INSTALLATION

- A. Locate joints as indicated on drawings and comply with ASTM C1063.
 - 1. Area of plaster panel not to exceed 144 sq ft for vertical surfaces.
 - 2. Area of plaster panel not to exceed 100 sq ft for horizontal, curved or angled surfaces.
 - 3. Spacing between control joints not to exceed 18 ft in each direction.
 - 4. Area bounded by control joints not to exceed a length-to-width ratio of 2-1/2 to 1.
- B. Install expansion joints where an expansion joint occurs in base exterior wall.
- C. Install prefabricated joint accessories in accordance with ASTM C1063.
 - 1. Control joints may be installed over continuous metal lath per TSIB TB 60.160
 - 2. Where control joints do not fall on solid backing attach expansion joint to lath using tie wire at maximum 6 inches on center.

3.04 LATH INSTALLATION

- A. Apply lath taut, with long dimension perpendicular to supports.
- B. Lap or nest ends of metal lath in accordance with ASTM C841.
- C. Secure end laps with tie wire where they occur between supports.

- D. Continuously reinforce internal angles with corner mesh, except where the metal lath returns 3 inches from corner to form the angle reinforcement; fasten at perimeter edges only.
- E. Place corner bead at external wall corners; fasten at outer edges of lath only.
- F. Place base screeds at termination of plaster areas; secure rigidly in place.
- G. Place lath vertically above each top corner and each side of door frames to 6 inches above ceiling line.
- H. Place casing beads at terminations of plaster finish. Butt and align ends. Secure rigidly in place.
- I. Place additional strip mesh diagonally at corners of lathed openings. Secure rigidly in place.

3.05 TOLERANCES

- A. Maximum Variation from True Lines and Levels: 1/8 inch in 10 feet.
- B. Maximum Variation from True Position: 1/8 inch.

END OF SECTION

**Section 09 24 00
Cement Plastering**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Cement plastering.

1.02 RELATED REQUIREMENTS

- A. Section 09 22 36 - Lath: Lath, furring, beads, screeds, and joint accessories for plaster base.

1.03 REFERENCE STANDARDS

- A. ASTM C926 - Standard Specification for Application of Portland Cement-Based Plaster; 2015b.
- B. TSIB Plaster Textures & Acrylic Finishes - Technical Services Information Bureau, Plaster Textures & Acrylic Finishes; 2024.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittals procedures.
- B. Product Data: Provide data on plaster materials and trim accessories.
- C. Samples:
 - 1. Submit two samples, 24 by 24 inch in size illustrating finish color and texture.

1.05 FIELD CONDITIONS

- A. Exterior Plaster Work: Do not apply plaster when substrate or ambient air temperature is 40 degrees F or lower, or when temperature is expected to drop below 40 degrees F within 48 hours of application.

PART 2 PRODUCTS

2.01 CEMENT PLASTER APPLICATIONS

- A. Lath Plaster Base: Metal lath.
 - 1. Plaster Type: Factory prepared plaster mix.
 - 2. Number of Coats: Three.
 - 3. First Coat: Apply to a nominal thickness of 3/8 inch.
 - 4. Second Coat: Apply to a nominal thickness of 3/8 inch.
 - 5. Leveling Coat: Apply to a nominal thickness of 1/32 to 1/16 inch.

6. Finish Coat: Apply to a nominal thickness of 1/8 inch.
 - a. Texture: Fine sand float. as defined by TSIB Plaster Textures & Acrylic Finishes
7. Finish: Acrylic.

2.02 FACTORY PREPARED CEMENT PLASTER

- A. Exterior Portland cement plaster system made of scratch and brown base coat, leveling coat with reinforcing mesh, and acrylic finish coat; install in accordance with ASTM C926.
- B. Premixed Base Coats: Mixture of cement, aggregate, fibers, and proprietary admixtures for scratch and brown coats; install in accordance with ASTM C926.
 1. Manufacturers:
 - a. LaHabra; Perma-Finish: www.lahabrastucco.com/#sle.
 - b. Omega Products International; Diamond Wall Pro: www.omega-products.com/#sle.
 - c. Parex USA, Inc; 202 Armourwall Stucco: www.parexusa.com/#sle.
 - d. Sto Corp; Sto Powerwall Stucco: www.stocorp.com/#sle.
- C. Premixed Leveling Coat: Acrylic polymer-based blend approved for use with plaster manufacturer's base coat and finish materials.
- D. Primer: Acrylic, as recommended by coating manufacturer and compatible with plaster base coat.
- E. Premixed Finish Coating: Integrally colored, acrylic coating.
 1. Color: As indicated on drawings.
 2. Manufacturers:
 - a. LaHabra; Perma-Flex Stucco: www.lahabrastucco.com/#sle.
 - b. Omega Products International; AkroFlex: www.omega-products.com/#sle.
 - c. Parex USA, Inc; DPR Acrylic Finish: www.parexusa.com/#sle.
 - d. Sto Corp; Sto Powerwall: www.stocorp.com/#sle.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions are acceptable prior to starting this work.
- B. Verify lath is flat, secured to substrate, and joint and surface perimeter accessories are properly in place.

3.02 MIXING

- A. Mix only as much plaster as can be used prior to initial set.
- B. Mix materials dry, to uniform color and consistency, before adding water.
- C. Protect mixtures from frost or freezing temperatures, contamination, and excessive evaporation.

3.03 APPLICATION

- A. Apply plaster in accordance with manufacturer's written instructions and comply with ASTM C926.
- B. Base Coats:
 - 1. Apply base coat(s) to fully embed lath and to specified thickness.
 - 2. Follow guidelines in ASTM C926 and manufacturer's written installation instructions for moist curing base coats and application of subsequent coats.
- C. Finish Coats:
 - 1. Cement Plaster:
 - a. Apply with sufficient material and pressure to ensure complete coverage of base to specified thickness.
 - b. Apply desired surface texture while mix is still workable.
 - 2. Primer and Acrylic Coatings:
 - a. Remove surface contaminants such as dust and dirt without damaging substrate.
 - b. Apply primer in accordance with manufacturer's instructions.
 - c. Apply finish coating in number of coats and to thickness recommended by manufacturer.

3.04 TOLERANCES

- A. Maximum Variation from True Flatness: 1/4 inch in 10 feet.

3.05 REPAIR

- A. Patching: Remove loose, damaged or defective plaster and replace with plaster of same composition; finish to match surrounding area.

END OF SECTION

Section 09 30 00

Tiling

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Tile for wall and base application.
- B. Cementitious backer board as tile substrate.
- C. Coated glass mat backer board as tile substrate.
- D. Non-ceramic trim.

1.02 RELATED REQUIREMENTS

- A. Section 03 3513 - High-Tolerance Concrete Floor Finishing
- B. Section 07 13 00 - Sheet Waterproofing.
- C. Section 07 14 00 - Fluid-Applied Waterproofing.
- D. Section 22 40 00 - Plumbing Fixtures: Shower receptor.

1.03 REFERENCE STANDARDS

- 1. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar; 1999 (Reaffirmed 2010).
- 2. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy; 1999 (Reaffirmed 2010).
- 3. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework; 1999 (Reaffirmed 2010).
- B. ANSI A108/A118/A136.1 - Specifications for the Installation of Ceramic Tile; 2020.
 - 1. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar; 2012 (Revised).
 - 2. ANSI A118.6 - American National Standard Specifications for Standard Cement Grouts for Tile Installation; 2010 (Revised).
- C. ASTM C847 - Standard Specification for Metal Lath; 2014a.
- D. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel; 2013.
- E. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2025.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
- C. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.
- D. Samples:
 - 1. Submit to the Architect two (2) samples of all selected colors of tile and all available colors of grout.
 - 2. Submit to the Architect two (2) 18"x 18' sample boards indicating all specified patterns, colors and trims of tile and grout.
- E. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum five years of documented experience.

1.06 MOCK-UPS

- A. See Section 01 40 00 - Quality Requirements for general requirements for mock-up.
- B. Construct tile mock-up where indicated by Architect, incorporating all components specified for the location.
 - 1. Approved mock-up may remain as part of work.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.08 FIELD CONDITIONS

- A. Do not install solvent-based products in an unventilated environment.
- B. Maintain ambient and substrate temperature above 50 degrees F and below 100 degrees F during installation and curing of setting materials.

1.09 EXTRA MATERIALS

- A. Provide 3 sq. ft of each size, color, and surface finish of tile specified.

PART 2 PRODUCTS

2.01 TILE

- A. Manufacturers: All products by the same manufacturer.
 - 1. Dal-Tile Corporation; _____: www.daltile.com/#sle.
 - 2. Or pre-approved prior to bid equal.
 - 3. Substitutions: See Section 01 61 00 - Product Requirements.
- B. Glazed Wall Tile: ANSI A137.1, standard grade.
 - 1. Moisture Absorption: 7.0 to 20.0 percent as tested in accordance with ASTM C373.
 - 2. Style: Refer to Plans
 - 3. Color(s): Refer to Plans.
 - 4. Pattern: Refer to Plans.
 - 5. Trim Units: Matching bullnose, base, and accent shapes in sizes coordinated with field tile.

2.02 SETTING MATERIALS

- A. Manufacturers:
 - 1. Custom Building Products: www.custombuildingproducts.com.
 - 2. LATICRETE International, Inc: www.laticrete.com/sle.
 - 3. Merkrete, by Parex USA, Inc: www.merkrete.com/sle.
 - 4. Substitutions: See Section 01 61 00 - Product Requirements.

2.03 ADHESIVE MATERIALS

- A. Manufacturers:
 - 1. Bonsal American, Inc: www.sakrete.com
 - 2. Bostik Inc: www.bostik-us.com.
 - 3. Mapei Corporation: www.mapei.com.
- B. Organic Adhesive: ANSI A136.1, thinset bond type.

2.04 MORTAR MATERIALS

- A. Manufacturers:
 - 1. Bostik Inc: www.bostik-us.com.
 - 2. Custom Building Products: www.custombuildingproducts.com.
- B. Mortar Bond Coat Materials:
 - 1. Latex-Portland Cement type: ANSI A118.4.

2.05 GROUTS

- A. Manufacturers:
 - 1. Bonsal American, Inc: www.sakrete.com
 - 2. Bostik Inc: www.bostik-us.com.
 - 3. Custom Building Products: www.custombuildingproducts.com.

2.06 ACCESSORY MATERIALS

- A. Reinforcing Mesh: 2 x 2 inch size weave of 16/16 wire size; welded fabric, galvanized.
- B. Backer Board at Walls and Wainscots: Cementitious backer board type complying with ANSI A108/A118/A136.1; 1/2 inch thick; 2 inch wide coated glass fiber tape for joints and corners.
- C. Backer Board at Showers: Thermal plastic faced extruded polystyrene foam backer board type complying with ANSI A118.10; 1/2 inch thick; 2 inch wide coated glass fiber tape for joints and corners.
- D. Backer Board: Coated glass mat type complying with ASTM C1178/C1178M; inorganic fiberglass mat on both surfaces and integral acrylic coating vapor retarder.
- E. Mesh Tape: 2 inch wide self-adhesive fiberglass mesh tape.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.

3.02 PREPARATION

- A. Protect surrounding work from damage.
- B. Vacuum clean surfaces and damp clean.
- C. Install thermal plastic faced extruded polystyrene foam backer tapered floor board in accordance with ANSI A108/A118/A136.1 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of setting material to a feather edge.
- D. Install thermal plastic faced extruded polystyrene foam backer board in accordance with ANSI A108 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of dry-set mortar to a feather edge.
- E. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.03 INSTALLATION - GENERAL

- A. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.
- B. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.
- C. Form internal angles square and external angles bullnosed.

- D. Install non-ceramic trim in accordance with manufacturer's instructions.
- E. Sound tile after setting. Replace hollow sounding units.
- F. Keep control and expansion joints free of mortar, grout, and adhesive.
- G. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- H. Grout tile joints unless otherwise indicated. Use standard grout unless otherwise indicated.
- I. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

3.04 INSTALLATION - SHOWERS AND BATHTUB WALLS

- A. At shower walls install in accordance with TCNA (HB) Method B412, over cementitious backer units with waterproofing membrane.
- B. Grout with standard grout as specified above.

3.05 INSTALLATION - WALL TILE

- A. Over coated glass mat water-resistant gypsum backer board on studs, install in accordance with TCNA (HB) Method W245.

3.06 CLEANING

- A. Clean tile and grout surfaces.

3.07 PROTECTION

- A. Do not permit traffic over finished floor surface for 4 days after installation.

3.08 SCHEDULE

- A. Refer to Plans - Interior Finish Schedule

End of Section

Section 09 51 00
Acoustical Ceilings

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Suspended metal grid ceiling system.
- B. Acoustical units.

1.02 RELATED REQUIREMENTS

- A. Section 07 21 00 - Board and Batt Insulation: Acoustical insulation.

1.03 REFERENCE STANDARDS

- A. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2013a.
- B. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2014.
- C. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2014.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on suspension system components and acoustical units.
- C. Samples: Submit two samples 12 by 12 inch in size illustrating material and finish of acoustical units.
- D. Samples: Submit two samples each, ____ inches long, of suspension system main runner, cross runner, and perimeter molding.

1.05 QUALITY ASSURANCE

- A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.06 FIELD CONDITIONS

- A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

1.07 PROJECT CONDITIONS

- A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Install acoustical units after interior wet work is dry.

1.08 EXTRA MATERIALS

- A. See Section 01 60 00 - Product Requirements, for additional provisions.
- B. Provide 80 sq ft of each type of acoustical unit for County's use in maintenance of project.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acoustic Tiles/Panels:
 - 1. Armstrong World Industries, Inc: www.armstrong.com.
 - 2. CertainTeed Corporation: www.certainteed.com.
 - 3. USG: www.usg.com.
- B. Suspension Systems:
 - 1. Same as for acoustical units.

2.02 ACOUSTICAL UNITS

- A. Acoustical Units - General: ASTM E1264, Class A.
- B. Acoustical Panels Type A:
 - 1. Light Reflectance: 87 percent, determined in accordance with ASTM E1264.
 - 2. NRC Range: 0.70 to 0.80, determined in accordance with ASTM E1264.
- C. Acoustical Panels Type B:
 - 1. Size: 24 inches by 48 inches.
 - 2. Light Reflectance: 87 percent, determined in accordance with ASTM E1264.
 - 3. NRC Range: 0.70 to 0.80, determined in accordance with ASTM E1264.
 - 4. Panel Edge: Square.
 - 5. Surface Pattern: Perforated.
 - 6. Surface Color: White.

2.03 SUSPENSION SYSTEM(S)

- A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold down clips, stabilizer bars, clips, and splices as required.
- B. Exposed Steel Suspension System Type A: Formed steel, commercial quality cold rolled; heavy-duty.
 - 1. Finish: Painted, color as selected.

2.04 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- B. Hanger Wire: 12 gauge, 0.08 inch galvanized steel wire.
- C. Perimeter Moldings: Same metal and finish as grid.
- D. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

3.02 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C 636, ASTM E 580, and manufacturer's instructions and as supplemented in this section.
- B. Install suspension system in accordance with DSA IR 25-2
- C. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- D. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 - 1. Use longest practical lengths.
- E. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

- G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- H. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- I. Do not eccentrically load system or induce rotation of runners.

3.03 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- E. Cutting Acoustical Units:
 - 1. Make field cut edges of same profile as factory edges.

3.04 TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

End of Section

**Section 09 65 00
Resilient Flooring**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Resilient base.
- B. Installation accessories.

1.02 RELATED REQUIREMENTS

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

1.03 REFERENCE STANDARDS

- A. ASTM F1861 - Standard Specification for Resilient Wall Base; 2008 (Reapproved 2012).

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.
- D. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store all materials off of the floor in an acclimatized, weather-tight space.
- B. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- C. Protect roll materials from damage by storing on end.

1.06 FIELD CONDITIONS

- A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

1.07 EXTRA MATERIALS

- A. See Section 01 60 00 - Product Requirements, for additional provisions.

1.08 WARRANTY

- A. Manufacturer's 10 year warranty on all products.
- B. Contractor to warranty installation for three (3) years.

PART 2 PRODUCTS

2.01 RESILIENT BASE

- A. Resilient Base - Type ____: ASTM F1861, Type TS rubber, vulcanized thermoset; style as scheduled.
 - 1. Height: 6 inch typical, 4 inch below casework.
 - 2. Thickness: 0.125 inch.
 - 3. Finish: Satin.
 - 4. Length: Roll.
 - 5. Color: As indicated on drawings.
 - 6. Manufacturers:
 - a. BurkeMercer Flooring Products: www.burkemercer.com.
 - b. Roppe Corp: www.roppe.com.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 ACCESSORIES

- A. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.
 - 1. VOC Content Limits: As specified in Section 01 61 16.
- B. Moldings, Transition and Edge Strips: Same material as flooring.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.

3.02 PREPARATION

- A. Clean substrate.
- B. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

3.03 INSTALLATION - RESILIENT BASE

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
- B. Install base on solid backing. Bond tightly to wall and floor surfaces.
- C. Scribe and fit to door frames and other interruptions.
- D. Install straight and level to variation of plus or minus 1/8 inch over 10 feet.

3.04 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's written instructions.

END OF SECTION

**Section 09 65 66
Resilient Athletic Flooring**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Resilient athletic floor tile.
- B. Accessories required for installation, maintenance and repair.

1.02 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied flooring.

1.03 REFERENCE STANDARDS

- A. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2016 (Reapproved 2021).
- B. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2005 (Reapproved 2010).
- C. CA (State of California) Section 01350: Standard Method for Testing and Evaluation of Volatile Organic Compound Emissions from Indoor Sources Using Environmental Chambers.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's printed data sheets for products specified, and printed installation guidelines.
- C. Shop Drawings: Fabrication and installation details, and layout, colors, and equipment locations.
- D. Selection Samples: Manufacturer's color charts for flooring materials specified, indicating full range of colors and textures available.
- E. Verification Samples: Actual flooring material specified, not less than 6 inch square, mounted on solid backing.
- F. Maintenance Guidelines: Provide manufacturer's printed maintenance guidelines for resilient athletic flooring.
- G. Warranty: Provide manufacturer's printed standard warranty for resilient athletic flooring.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer must have a minimum of 15 years of experience in the manufacturing of prefabricated resilient athletic flooring.
- B. Installer Qualifications: An experienced installer with experience in installations for the last 3 years and certified in writing by the flooring manufacturer to be qualified for installation of specified flooring system.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to project site in unopened containers clearly labeled with manufacturer's name and identification of contents.
- B. Store materials in dry and clean location until needed for installation. During installation, handle in a manner that will prevent marring and soiling of finished surfaces.

1.07 FIELD CONDITIONS

- A. Maintain temperature in spaces to receive adhesively installed resilient flooring within range of 70 to 95 degrees F for not less than 48 hours before the beginning of installation and for not less than 48 hours after installation has been completed. Subsequently, do not allow temperature in installed spaces to drop below 50 degrees F or to go above 100 degrees F.

PART 2 PRODUCTS

2.01 PREFORMED ATHLETIC FLOORING

- A. Manufacturers: All products by the same manufacturer.
 - 1. Ecore Commercial Flooring: www.ecorecommercial.com.
 - 2. Substitutions: See Section 01 61 00 - Product Requirements.
- B. Rubber Tile Flooring: Resilient rubber athletic flooring, calendered and vulcanized with a base of natural and synthetic rubbers, stabilizing agents formed into square tiles.
 - 1. Thickness: Minimum 5/16 inch.
 - 2. Size: Nominal 24 inch square.
 - 3. Tensile Strength: Minimum 200 psi, per ASTM D412.
 - 4. Color: Chunky Monkey 646.

2.02 ACCESSORIES

- A. Leveling Compound: As recommended by flooring manufacturer for substrate conditions.
- B. Flooring Adhesive: Waterproof; types recommended by flooring manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates for conditions detrimental to installation of athletic flooring. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of athletic flooring to substrate.
- C. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
 - 1. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
- D. Gypsum drywall surfaces: Verify that substrate is free of dust and elements that might interfere with bonding of athletic flooring to substrate.

3.02 PREPARATION

- A. Concrete: Use leveling compound as necessary to achieve substrate flatness of plus or minus 1/8 inch within 10 ft radius.
- B. Remove coatings that are incompatible with flooring adhesives, using methods recommended by flooring manufacturer.
- C. Broom clean floor areas to receive athletic flooring immediately before beginning installation.
- D. Clean and prepare wall areas to receive athletic flooring as wainscot material before beginning installation using methods and adhesives recommended by flooring manufacturer.

3.03 INSTALLATION

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install in accordance with manufacturer's written instructions.
- C. Rubber Tile Flooring:
 - 1. Lay out center lines in spaces to receive tile flooring, based on location of principal walls. Start tile installation from center, and adjust as necessary to avoid tiles less than one-half width at perimeter.
 - 2. Lay tiles square with room axis, matching for color and pattern by selecting from cartons and mixing as recommended by manufacturer.
- D. Rubber Tile Wall Wainscot:

1. Horizontal Layout: Layout center line of wall to receive rubber tile as wainscot. Start tile installation at center of wall working toward each end, adjust as necessary to avoid tiles less than one-half at terminous of wall surface.
2. Vertical Layout: Start layout of tile at top of wainscot height with full tile, with full tile down to floor level, adjusting as necessary to avoid tiles less than one-half at terminous to floor.

3.04 CLEANING

- A. Clean flooring using methods recommended by manufacturer.

3.05 PROTECTION

- A. Protect finished athletic flooring from construction traffic in accordance with manufacturer's written instructions to ensure that it is without damage upon Date of Substantial Completion.

End of Section

Section 09 91 13
Exterior Painting

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
- D. Do Not Paint or Finish the Following Items:
 - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
 - 5. Floors, unless specifically indicated.
 - 6. Glass.
 - 7. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

- A. Section 09 91 23 - Interior Painting.

1.03 DEFINITIONS

- A. Comply with ASTM D16 for interpretation of terms used in this section.

1.04 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; Current Edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2014.
- C. CARB (SCM) - Suggested Control Measure for Architectural Coatings; California Air Resources Board; 2007.
- D. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition, www.paintinfo.com.

- E. SCAQMD 1113 - South Coast Air Quality Management District Rule No.1113; current edition.
- F. SSPC-SP 1 - Solvent Cleaning; 2015.
- G. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).
- H. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
 - 2. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
- C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
 - 1. Where sheen is specified, submit samples in only that sheen.
 - 2. Where sheen is not specified, discuss sheen options with Architect before preparing samples, to eliminate sheens not required.
 - 3. Allow 30 days for approval process, after receipt of complete samples by Architect.
- D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- E. Manufacturer's Instructions: Indicate special surface preparation procedures.
- F. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, and repair of painted and finished surfaces.
- G. Maintenance Materials: Furnish the following for County's use in maintenance of project.
 - 1. See Section 01 61 00 - Product Requirements, for additional provisions.
 - 2. Extra Paint and Finish Materials: 1 gallon of each color; from the same product run, store where directed.
 - 3. Label each container with color in addition to the manufacturer's label.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum three years experience and approved by manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

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

1.08 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the paint product manufacturer's temperature ranges.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.
- B. Paints:
 - 1. Sherwin-Williams Company; ____: www.sherwin-williams.com/#sle.
- C. Primer Sealers: Same manufacturer as top coats.
- D. Substitutions: See Section 01 61 00 - Product Requirements.

2.02 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready-mixed, unless required to be a field-catalyzed paint.
 - 1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 - 2. Supply each paint material in quantity required to complete entire project's work from a single production run.
 - 3. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is described explicitly in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content:
 - 1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.

- b. SCAQMD 1113 Rule.
 - c. Architectural coatings VOC limits of California.
- 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- C. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.
- D. Colors: To be selected from manufacturer's full range of available colors.
 - 1. Selection to be made by Architect after award of contract.
 - 2. The Architect will prepare a color schedule with samples for guidance in painting after the color selection from samples submitted.
 - 3. Allow for minimum of three colors for each system, unless otherwise indicated, without additional cost to County.

2.03 PAINT SYSTEMS - EXTERIOR

- A. Paint E-OP - Exterior Surfaces to be Painted, Unless Otherwise Indicated: Including concrete, concrete masonry units, brick, fiber cement siding, primed wood, and primed metal.
 - 1. Two top coats and one coat primer.
 - 2. Top Coat(s): Exterior Latex.

2.04 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.
- C. Test shop-applied primer for compatibility with subsequent cover materials.
- D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Fiber Cement Siding: 12 percent.
 - 2. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
 - 3. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.

3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.
- D. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- F. Concrete:
- G. Masonry:
- H. Fiber Cement Siding: Remove dirt, dust and other foreign matter with a stiff fiber brush. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
- I. Galvanized Surfaces:
 - 1. Prepare surface according to SSPC-SP 2.
- J. Ferrous Metal:
 - 1. Solvent clean according to SSPC-SP 1.
 - 2. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.
- K. Exterior Wood Surfaces to Receive Opaque Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior calking compound after prime coat has been applied. Back prime concealed surfaces before installation.
- L. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

- A. Exterior Wood to Receive Opaque Finish: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 4 weeks.
- B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

- D. Apply each coat to uniform appearance.
- E. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply additional coats until complete hide is achieved.
- F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- G. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

3.06 SCHEDULE - PAINT SYSTEMS

- A. Fiber Cement Siding: Finish surfaces exposed to view.
- B. Steel Fabrications: Finish surfaces exposed to view.
- C. Galvanized Steel: Finish surfaces exposed to view.
- D. Shop-Primed Metal Items: Finish surfaces exposed to view.

END

Section 09 91 23
Interior Painting

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
 - 1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
 - 2. Mechanical and Electrical:
 - a. In finished areas, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
 - b. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
- D. Do Not Paint or Finish the Following Items:
 - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
 - 5. Stainless steel, anodized aluminum, bronze, terne-coated stainless steel, and lead items.
 - 6. Floors, unless specifically indicated.
 - 7. Brick, architectural concrete, cast stone, integrally colored plaster, and stucco.
 - 8. Glass.
 - 9. Acoustical materials, unless specifically indicated.
 - 10. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 05 50 00 - Metal Fabrications: Shop-primed items.
- C. Section 09 91 13 - Exterior Painting.

1.03 DEFINITIONS

- A. Comply with ASTM D16 for interpretation of terms used in this section.

1.04 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; Current Edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2014.
- C. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2007.
- D. CARB (SCM) - Suggested Control Measure for Architectural Coatings; California Air Resources Board; 2007.
- E. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition, www.paintinfo.com.
- F. SSPC-SP 1 - Solvent Cleaning; 2015.
- G. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g., "alkyd enamel").
 - 2. MPI product number (e.g., MPI #47).
 - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
- C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
 - 1. Where sheen is specified, submit samples in only that sheen.
 - 2. Where sheen is not specified, submit each color in each sheen available.
- D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- E. Manufacturer's Instructions: Indicate special surface preparation procedures.
- F. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years experience and approved by manufacturer.

1.07 MOCK-UP

- A. Locate where directed by Architect.
- B. Mock-up may remain as part of the work.

1.08 DELIVERY, STORAGE, AND HANDLING

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

1.09 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Minimum Application Temperatures for Paints: 50 degrees F for interiors unless required otherwise by manufacturer's instructions.
- D. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.
- B. Paints:
 - 1. Sherwin-Williams Company: www.sherwin-williams.com/#sle.
 - 2. Dunn Edwards Paints: www.dunnedwards.com..

- C. Substitutions: See Section 01 61 00 - Product Requirements.

2.02 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready-mixed, unless intended to be a field-catalyzed paint.
1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 2. Supply each paint material in quantity required to complete entire project's work from a single production run.
 3. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content:
1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
 - b. CARB (SCM).
 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

2.03 PAINT SYSTEMS - INTERIOR

- A. Paint I-OP - Interior Surfaces to be Painted, Unless Otherwise Indicated: Including gypsum board, concrete, concrete masonry units, brick, wood, plaster, uncoated steel, shop primed steel, galvanized steel, aluminum, and acoustical ceilings.
1. Two top coats and one coat primer.
 2. Top Coat(s): Institutional Low Odor/VOC Interior Latex; MPI #143, 144, 145, 146, 147, or 148.
 - a. Products:
 - 1) Sherwin-Williams ProMar 200 Zero VOC Interior Latex, Flat.
 - 2) Sherwin-Williams ProMar 200 Zero VOC Interior Latex, Low Sheen. (MPI #144)
 - 3) Sherwin-Williams ProMar 200 Zero VOC Interior Latex, Semi-Gloss.
 3. Top Coat(s): Interior Latex; MPI #43, 44, 52, 53, 54, or 114.
 - a. Products:
- B. Paint I-OP-MD-DT - Medium Duty Door/Trim: For surfaces subject to frequent contact by occupants, including metals and wood:
1. Medium duty applications include doors, door frames, railings, handrails, guardrails, and balustrades.
 2. Two top coats and one coat primer.
 3. Top Coat(s): Interior Epoxy-Modified Latex; MPI #115 or 215.
 - a. Products:
 - 1) Sherwin-Williams Waterbased Catalyzed Epoxy, Semi-Gloss.

2.04 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin application of paints and finishes until substrates have been adequately prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- D. Test shop-applied primer for compatibility with subsequent cover materials.
- E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:
 - 1. Gypsum Wallboard: 12 percent.
 - 2. Plaster and Stucco: 12 percent.
 - 3. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
 - 4. Interior Wood: 15 percent, measured in accordance with ASTM D4442.

3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- D. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Concrete:
- F. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
- G. Plaster: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

- H. Aluminum: Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
- I. Galvanized Surfaces:
 - 1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
- J. Ferrous Metal:
 - 1. Solvent clean according to SSPC-SP 1.
 - 2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
 - 3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.
- K. Wood Doors to be Field-Finished: Seal wood door top and bottom edge surfaces with clear sealer.
- L. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- D. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- E. Sand wood and metal surfaces lightly between coats to achieve required finish.
- F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- G. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

- A. Protect finishes until completion of project.

- B. Touch-up damaged finishes after Substantial Completion.

3.06 SCHEDULE - PAINT SYSTEMS

- A. Gypsum Board: Finish surfaces exposed to view, except _____.
 - 1. Interior Walls: GI-OP-3A, semi-gloss.
- B. Steel Doors and Frames: Finish surfaces exposed to view; MI-OP-3A, gloss.
- C. Steel Fabrications: Finish surfaces exposed to view, except _____.
 - 1. Interior: MI-OP-3L, gloss.
- D. Shop-Primed Metal Items: Finish surfaces exposed to view, except _____.
 - 1. Finish the following items:
 - a. Exposed surfaces of steel stairs and railings.
 - 2. Interior: MI-OP-2A.

END OF SECTION

Section 10 11 00
Visual Display Units

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Porcelain enamel steel markerboards.
- B. Tackboards.
- C. Markerboards and Tackboards, Board and Edge Trim for Map by Owner

1.02 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Blocking and supports.
- B. Section 06 20 00 - Finish Carpentry: Wood frame and marker rails.
- C. Section 09 91 23 - Interior Painting: Finishing of wood frame and marker rail.

1.03 REFERENCE STANDARDS

- A. ANSI A208.1 - American National Standard for Particleboard; 2022.
- B. ASTM A424/A424M - Standard Specification for Steel, Sheet, for Porcelain Enameling; 2009a.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data on chalkboard, porcelain enamel steel markerboard, glass markerboard, tackboard, tackboard surface covering, trim, and accessories.
- C. Samples: Two, 2 by 2 inches in size illustrating materials and finish, color and texture of chalkboard, porcelain enamel steel markerboard, glass markerboard, tackboard, tackboard surfacing, and trim.
- D. Manufacturer's printed installation instructions.

1.05 QUALITY ASSURANCE

1.06 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year warranty for markerboard to include warranty against discoloration due to cleaning, crazing or cracking, and staining.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Visual Display Boards:
 - 1. Claridge Products and Equipment, Inc: www.claridgeproducts.com.
 - 2. Polyvision Corporation (Nelson Adams): www.polyvision.com.

2.02 VISUAL DISPLAY UNITS

- A. Porcelain Enamel Steel Markerboards:
 - 1. Steel Face Sheet Thickness: 24 gauge, 0.0239 inch .
 - 2. Core: Particleboard, manufacturer's standard thickness, laminated to face sheet.
 - 3. Backing: Aluminum foil, laminated to core.
 - 4. Size: As indicated on drawings.
- B. Map Frame and Backing: Map Provided by Owner
 - 1. Backing: _____, 1/2 inch thick.
 - 2. Size: As indicated on drawings. (Verify with owner)
 - 3. Frame: Extruded aluminum , with concealed fasteners.
 - 4. Frame Profile: Manufacturer's standard
 - 5. Frame Finish: Anodized, natural.
- C. Tackboards: Fine-grained, homogeneous natural cork.
 - 1. Cork Thickness: 1/8 inch.

2.03 MATERIALS

- A. Porcelain Enameled Steel Sheet: ASTM A424/A424M, Type I, Commercial Steel, with fired-on vitreous finish.
- B. Particleboard: ANSI A208.1; wood chips, set with waterproof resin binder, sanded faces.
- C. Foil Backing: Aluminum foil sheet, 0.005 inch thick.
- D. Adhesives: Type used by manufacturer.

2.04 ACCESSORIES

- A. Temporary Protective Cover: Sheet polyethylene, 8 mil thick.
- B. Mounting Brackets: Concealed.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that internal wall blocking is ready to receive work and positioning dimensions are as indicated on shop drawings.

3.02 INSTALLATION

- A. Install boards in accordance with manufacturer's instructions.
- B. Secure units level and plumb.

3.03 CLEANING

- A. Clean board surfaces in accordance with manufacturer's instructions.
- B. Cover with protective cover, taped to frame.
- C. Remove temporary protective cover at Date of Substantial Completion.

END OF SECTION

**Section 10 11 24
Tackable Wall Systems**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Site fabricated, fabric-covered tackable wall system.
- B. Accessories as required for complete installation.

1.02 RELATED REQUIREMENTS

- A. Section .
- B. Section 09 2116 - Gypsum Board Assemblies

1.03 REFERENCE STANDARDS

- A. ANSI A208.2 - Medium Density Fiberboard (MDF) for Interior Applications; 2022.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026.
- C. ASTM E2573 - Standard Practice for Specimen Preparation and Mounting of Site-Fabricated Stretch Systems to Assess Surface Burning Characteristics; 2012.

1.04 SUBMITTALS

- A. See Section , for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
 - 4. Specimen warranty.
- C. Selection Samples: Fabric swatches representing manufacturer's full range of available colors, textures, and patterns.
- D. Verification Samples:
 - 1. For each fabric specified, minimum size square, representing actual product in color, texture, and pattern.
 - 2. Actual samples of all track profiles to be employed, including transitions between dissimilar profiles.
 - 3. Tackable core backing material, minimum square.

- E. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in County's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Provide components of tackable wall systems by single manufacturer, including recommended primers, adhesives, and sealants.
- B. Installer Qualifications: Firm specializing in site-fabricated wall systems, with not less than years of documented experience in installing wall systems of the type specified, and approved by the manufacturer.
- C. Surface Burning Characteristics: Provide system with flame spread index of 25, maximum, and smoke developed index of 40, maximum, when tested in accordance with ASTM E84.
- D. Mock-Up: Provide a mock-up for evaluation of application workmanship.
 - 1. Finish areas designated by Architect.
 - 2. Do not proceed with remaining work until workmanship and overall appearance are approved by Architect.
 - 3. Refinish mock-up area as required to produce acceptable workmanship.
 - 4. Approved mock-up remain as part of the completed Work.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect fabric, core, and track from excessive moisture in shipment, storage, and handling. Do not deliver materials to project until wet work such as concrete and plaster has been completed.
- B. Store products in manufacturer's unopened packaging until ready for installation.
- C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.07 FIELD CONDITIONS

- A. Do not begin installation until interior conditions have reached temperature and humidity that will be maintained during occupancy. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.08 WARRANTY

- A. See Section , for additional warranty requirements.
- B. Correct defective Work within a period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Tackable Wall Systems:

1. Fabricmate Systems: www.fabricmate.com/#sle.
2. Fabri-Trak Systems, Inc : www.fabritrak.com.
3. Fabric Wall : www.actsusa.com.

2.02 TACKABLE WALL SYSTEM

- A. Tackable Wall System: Site-installed stretched fabric over tackable core and continuous perimeter and intermediate mounting extrusions applied directly to wall surface; designed to permit removal and replacement of fabric in individual panels without affecting adjacent panels.
 1. Surface Burning Characteristics: Flame Spread Index of , maximum; Smoke Developed Index of , maximum; when whole system is tested in accordance with ASTM E84 using mounting specified in ASTM E2573 for stretched systems.
 2. Prefabricated framed panels are not acceptable.
 3. Fabric must be installed over tackable substrate without adhesives, tapes, or fasteners.
- B. Verify that all adhesives and sealants employed in installation of tackable wall systems are low-emission types, with low VOC ratings.

2.03 MATERIALS

- A. Frame: Extruded polymer track system with serrated jaws of sufficient strength to hold fabric in place after repeated applications.
 1. Track Size: protrusion from wall with minimum base leg.
 2. Track Shape: at perimeter; at intermediate abutting joints.
 3. Wall Thickness of Track: Minimum .
 4. Profile: Beveled, 1/2 inch overall height. Beveled Freestanding at exposed edges of panels
 5. Intermediate Joints: Butt joints square.
 6. Color:
- B. Core: Same thickness as track.
- C. Tackable Core: Fiberboard, 14-16 pcf density, flame retardant, 1/2 inch thickness.
- D. Fabric: Heavy-duty fire-retardant commercial fabric, as provided by manufacturer of tackable wall system; color, pattern, and texture .
- E. Fasteners: As recommended by manufacturer of tackable wall system for project conditions.
- F. Adhesives: Low VOC or water-based, approved by wall system manufacturer, and complying with requirements of Section .

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.

- B. Verify that all casework, markerboards, door and window jambs, finished ceiling, and other finished items abutting tackable wall systems have been installed.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 INSTALLATION

- A. Install tackable wall systems at locations indicated, complying with manufacturer's instructions.

3.03 CLEANING

- A. Clean exposed surfaces of tackable wall system, complying with manufacturer's instructions for cleaning and repair of minor finish damage. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

End of Section

Section 10 14 00

Signage

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Room and door signs.
- B. Interior directional and informational signs.
- C. Interior Room Occupancy Signage at Community Room (Flat Sign)
- D. Building identification signs.
- E. Plaque.
- F. Traffic signs.
- G. Exterior Accessibility Signage
- H. Self Illuminating low level exit signs

1.02 RELATED REQUIREMENTS

- A. Section 22 05 53 - Identification for Plumbing Piping and Equipment.
- B. Section 26 05 53 - Identification for Electrical Systems.

1.03 REFERENCE STANDARDS

- A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.
- B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- C. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2009.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.

- C. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
 - 1. When content of signs is indicated to be determined later, request such information from County through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
 - 2. Submit for approval by County through Architect prior to fabrication.
- D. Samples: Submit two samples of each type of sign, of size similar to that required for project, illustrating sign style, font, and method of attachment.
- E. Selection Samples: Where colors are not specified, submit two sets of color selection charts or chips.
- F. Manufacturer's Installation Instructions: Include installation templates and attachment devices.
- G. Manufacturer's Qualification Statement.
- H. Maintenance Materials: Furnish the following for County's use in maintenance of project.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Package signs as required to prevent damage before installation.
- B. Package room and door signs in sequential order of installation, labeled by floor or building.
- C. Store tape adhesive at normal room temperature.

1.07 FIELD CONDITIONS

- A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.
- B. Maintain this minimum temperature during and after installation of signs.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Flat Signs:
 - 1. Best Sign Systems, Inc: www.bestsigns.com.
 - 2. Mohawk Sign Systems, Inc: www.mohawksign.com.
 - 3. Ark Ramos: www.arkramos.com
 - 4. Substitutions: See Section 01 61 00 - Product Requirements.

- B. Dimensional Letter Signs:
 - 1. Cosco Industries; Cast Aluminum: www.coscoarchitecturalsigns.com/#sle.
 - 2. Substitutions: See Section 01 61 00 - Product Requirements.
- C. Low Level Self Illuminating Exit Signs
 - 1. SignDirect: www.signdirect.com - Product: Tritium 10 year Self Luminous Exit Sign
 - 2. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Exterior Accessibility Signage
 - 1. Best Sign Systems: www.bestsigns.com
 - 2. Substitutions: See Section 01 61 00 - Product Requirements.
- E. Plaques:
 - 1. Ark Ramos: www.arkramos.com
 - 2. Substitutions: See Section 01 61 00 - Product Requirements.

2.02 SIGNAGE APPLICATIONS

- A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.
- B. Room and Door Signs: Provide a sign for every doorway, whether it has a door or not, not including corridors, lobbies, and similar open areas.
 - 1. Sign Type: Flat signs with engraved panel media as specified.
 - 2. Provide "tactile" signage, with letters raised minimum 1/32 inch and Grade II braille.
 - 3. Character Height: 1 inch.
 - 4. Sign Height: 2 inches, unless otherwise indicated.
 - 5. Office Doors: Identify with room numbers to be determined later, not the numbers indicated on drawings; in addition, provide "window" section for replaceable occupant name.
 - 6. Conference and Meeting Rooms: Identify with room numbers to be determined later, not the numbers indicated on drawings; in addition, provide "window" section with sliding "In Use/Vacant" indicator.
 - 7. Service Rooms: Identify with Room names as shown on the drawings, no numbers are to appear on signs.
 - 8. Rest Rooms: Identify non accessible restrooms with pictograms, the names, and braille. Identify accessible restroom(s) adjacent to lobby with pictogram per American with Disabilities Act.
- C. Exterior Accessibility Signage: To Comply with the American Disabilities Act and as shown on drawings, included but not limited to:
 - 1. Van Accessible Parking Space Signage
 - 2. Accessible Building Entrance Signage at front door
 - 3. Parking Lot Entry "Tow Away" Signage - Obtain information from local jurisdiction.
- D. Building Identification Signs:
 - 1. Use individual metal letters.
 - 2. Finish: As Selected by Architect from Manufacturer's full line.
 - 3. Style: As Selected by Architect from Manufacturer's full line.

4. Mount: PM-1
 5. Size: as shown on Drawings.
 6. Mount on outside wall in location indicated on drawings.
- E. Plaque:
1. Model: A-00
 2. Finish : As selected by Architect from manufacturer's full line
 3. Letter Style: No 530 Optima
 4. Border Style: No 516
 5. Texture: Matte
 6. Mount: No 2
 7. Size: To be determined by owner. (Assume 24"x30" for bid purposes.)
 8. Text: To be determined by owner. (Includes Text and Custom Graphics with Ark Ramos "Perfect Impressions" or equal.)
- F. Traffic Signs: Locate where indicated on the drawings.
- G. Low Level Self Illuminating Exit Signs - Locate on wall within 8" of floor at strike side of all doors that have powered exit signs.
1. Color: To be selected by Architect

2.03 SIGN TYPES

- A. Flat Signs: Signage media without frame.
1. Edges: Square.
 2. Corners: Square.
 3. Wall Mounting of One-Sided Signs: Tape adhesive.
- B. Color and Font: Unless otherwise indicated:
1. Character Font: Helvetica, Arial, or other sans serif font.
 2. Character Case: Upper case only.
 3. Background Color: To Be Selected by Architect.
 4. Character Color: Contrasting color. To Be Selected By Architect.

2.04 TACTILE SIGNAGE MEDIA

- A. Engraved Panels: Laminated colored plastic; engraved through face to expose core as background color:
1. Total Thickness: 1/16 inch.

2.05 PLAQUES

- A. Metal Plaques:

2.06 DIMENSIONAL LETTERS

- A. Metal Letters:
1. Mounting: Tape adhesive.

2.07 ACCESSORIES

- A. Concealed Screws: Stainless steel, galvanized steel, chrome plated, or other non-corroding metal.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install neatly, with horizontal edges level.
- C. Protect from damage until Date of Substantial Completion; repair or replace damaged items.

END OF SECTION

**Section 10 14 19
Dimensional Letter Signage**

PART 2 PRODUCTS

1.01 DIMENSIONAL LETTERS

1.02 ACCESSORIES

End of Section

**Section 10 26 01
Wall and Corner Guards**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Corner guards.

1.02 RELATED REQUIREMENTS

- A. Section : for attachment of work of this section, concealed in wall.
- B. Section : Blocking for wall and corner guard anchors.

1.03 REFERENCE STANDARDS

- A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2020.

1.04 SUBMITTALS

- A. See Section , for submittal procedures.
- B. Product Data: Indicate .
- C. Samples: Submit sections of , long, illustrating component design, configuration, color and finish.
- D. Manufacturer's Instructions: Indicate special procedures, perimeter conditions requiring special attention.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Wall and Corner Guards:
 - 1. Construction Specialties, Inc: www.c-sgroup.com.

2.02 COMPONENTS

- A. Corner Guards - Surface Mounted: Extruded one-piece unit without splices, installed with screws.
 - 1. Material: Type 304 stainless steel, No. 4 finish.
 - 2. Size: 2 inches.
 - 3. Length: One piece.

- B. Mounting Brackets and Attachment Hardware: Appropriate to component and substrate.

2.03 FABRICATION

- A. Fabricate components with tight joints, corners and seams.
- B. Form end trim closure by capping and finishing smooth.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that rough openings, concealed blocking, and anchors are correctly sized and located.

3.02 INSTALLATION

- A. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to wall framing members only.
- B. Position corner guard 6 inches above finished floor (flush with top of concrete curb, where occurs) to 84 inches high.

3.03 TOLERANCES

- A. Maximum Variation From Required Height:
- B. Maximum Variation From Level or Plane For Visible Length:

3.04 SCHEDULE

- A. Corner Guard at all outside wall corners at the following locations:
 - 1. Apparatus Bay
 - 2. Decon/Laundry Room
 - 3. Turnout Room
 - 4. Workshop

END OF SECTION

**Section 10 28 13
Toilet, Bath, & Laundry Accessories**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Toilet Room and Lavatory Accessories.
- B. Utility Room Accessories.

1.02 RELATED SECTIONS

- A. Section 06100 - Rough Carpentry

1.03 REFERENCES

- A. ASTM A 240/A 240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications; 2005.
- B. ASTM A 554 - Standard Specification for Welded Stainless Steel Mechanical Tubing; 2003.
- C. ASTM C 1036 - Standard Specification for Flat Glass; 2001.
- D. ASTM F 446 - Standard Consumer Safety Specification for Grab Bars and Accessories Installed in the Bathing Area; 1985 (Reapproved 2004).

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's product data for products specified, indicating selected options and accessories.
- C. Shop Drawings:
 - 1. Plans: Locate each specified unit in project.
 - 2. Elevations: Indicate mounting height of each specified unit in project.
 - 3. Details: Indicate anchoring and fastening details, required locations and types of anchors and reinforcement, and materials required for correct installation of specified products not supplied by manufacturer of products of this section.
- D. Closeout Submittals: Warranty documents, issued and executed by manufacturer of products of this section, and countersigned by Contractor.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum five (5) years of documented experience producing products of the types specified in this section.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Factory-apply strippable protective vinyl coating to sight-exposed surfaces after finishing of products; ship products in manufacturer's standard protective packaging.
- B. Storage and Protection: Store products in manufacturer's protective packaging until installation.

1.07 SEQUENCING

- A. Supply locating and sizing templates, and other requirements, to fabricators and installers of products referenced in RELATED SECTIONS Article for building in products of this section.

1.08 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Manufacturer's standard warranty against defects in product workmanship and materials.
- C. Manufacturer's 10-year warranty against silver spoilage of mirrors.
- D. Manufacturer's 10 year warranty, 3 years for motor brushes, for hand dryers.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Products Listed are manufactured by: Bobrick Washroom Equipment, Inc.
- B. Acceptable Manufacturers:
 - 1. Bobrick Washroom Equipment: Bobrick.com
 - 2. ASI-American Specialties, Inc; www.americanspecialties.com
- C. Substitutions: Section 01 60 00 - Product Requirements.

2.02 FASTENINGS

- A. All toilet and bath accessories shall be complete with all required fastenings, and all fastenings shall harmonize with the item being fastened. All accessories requiring attachment shall be screw-mounted, set in solid backing or reinforced concrete unit masonry, unless otherwise noted.

2.03 TOILET ACCESSORIES

- A. Basic Construction Requirements:
 - 1. Doors: Fabricated from minimum 0.0313 inch stainless steel sheet, formed hems at sight-exposed edges; welded corners, finished to match sheet finish.
 - 2. Cabinets: Fabricated from minimum 0.0313 inch stainless steel sheet, formed hems at sight-exposed edges; all joints welded, sight-exposed welds finished to match sheet finish.
 - 3. Hinges: Stainless steel piano hinge, 3/16 inch diameter barrel, full length of cabinet; hinge leaves spot-welded to door and cabinet body.
 - 4. Locks: Tumbler locks, keyed alike other toilet accessory locks, with two keys for each lock.
 - 5. Stainless Steel Finish: No.4 satin unless otherwise specified.
- B. Paper Towel Dispenser/ Waste Receptacle: Classic series - recessed, Model B-369.
- C. Toilet Seat Cover Dispenser : Classic series - surface mounted, Model B-221.
- D. Toilet Paper Holder: Double roll tissue dispenser with controlled delivery - surface mounted, Model B-274.
- E. Baby Changing Station : Model KB110-SSRE.
- F. Robe Hook : Model B-677.
- G. Shower Curtain Rod : Classic Series - Extra Heavy Duty - Model B-6047.
- H. Shower Curtain : Model 204-3, with Model 204-1 hooks.
- I. Mop Holder : Model B223x36.
- J. Towel Bar: Extra heavy duty, Model B-530 24

2.04 MIRRORS

- A. Mirror : Model B-165 2436.
 - 1. Finish: No.4 satin stainless steel.
- B. Channel Mirror Frames: Fabricated from 0.0375 inch stainless steel, formed to 1/2 by 1/2 by 1/2 inch channel; finished to match sheet finish; concealed mounting brackets with tamper-proof fasteners.
- C. Tempered Glass Mirror: 1/4 inch thick polished tempered glass, two coats silver, hermetically sealed with uniform electrolytically-deposited copper plating, backpainted with waterproof coating.

2.05 GRAB BARS

- A. Grab Bars - Basic Requirements: Fabricated to comply with ASTM F 446 and to withstand a 900 pound force, from ASTM A 554 stainless steel tubing, 18 gauge (1.2mm), Type 304, 18-8 alloy; formed 1-1/2 inch radius return to wall at each end; each end heliarc-welded to minimum

1/8" thick stainless steel circular flange; welds finished to match tube finish. Flange covers shall be 22 gauge and shall snap over mounting flanges to conceal mounting screws.

- B. Grab Bars: Series B-5806.
 - 1. Sizes and configurations: As indicated on drawings.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions:
 - 1. Prepared openings are sized and located in accordance with shop drawings.
 - 2. Reinforcement and anchoring devices are correct type and are located in accordance with shop drawings.
- B. Installer's Examination:
 - 1. Installer of this section shall examine conditions under which construction activities of this section are to be performed, then submit written notification if such conditions are unacceptable.
 - 2. Beginning construction activities of this section indicates installer's acceptance of conditions.

3.02 INSTALLATION

- A. Install toilet accessories plumb and level in accordance with manufacturer's printed installation instructions.
- B. Locate toilet accessories at heights specified by Americans with Disabilities Act (ADA).

3.03 CLEANING

- A. Remove manufacturer's protective vinyl coating from sight-exposed surfaces 24 hours before final inspection.
- B. Clean surfaces in accordance with manufacturer's recommendations.

3.04 PROTECTION OF INSTALLED PRODUCTS

- A. Protect products from damage caused by subsequent construction activities.
- B. Field repair of damaged product finishes is prohibited; replace products having damaged finishes caused by subsequent construction activities.

End of Section

**Section 10 44 00
Fire Protection Specialties**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fire extinguishers.
- B. Fire extinguisher cabinets.

1.02 RELATED REQUIREMENTS

- A. Section 06100 - Rough Carpentry

1.03 REFERENCE STANDARDS

- A. NFPA 10 - Standard for Portable Fire Extinguishers; 2013.
- B. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

1.04 PERFORMANCE REQUIREMENTS

- A. Conform to NFPA 10.
- B. Provide extinguishers classified and labeled by Underwriters Laboratories Inc. for the purpose specified and indicated.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.

1.06 FIELD CONDITIONS

- A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Fire Extinguishers:
 - 1. Ansul, a Tyco Business: www.ansul.com.

2. Kidde, a unit of United Technologies Corp: www.kidde.com.
 3. Nystrom, Inc: www.nystrom.com/sle.
 4. Pyro-Chem, a Tyco Business: www.pyrochem.com.
- B. Fire Extinguisher Cabinets and Accessories:
1. Ansul, a Tyco Business: www.ansul.com.
 2. Kidde, a unit of United Technologies Corp: www.kidde.com.
 3. Nystrom, Inc: www.nystrom.com/sle.
 4. Pyro-Chem, a Tyco Business: www.pyrochem.com.
 5. Or pre-approved equal
 6. Substitutions: See Section 01 61 00 - Product Requirements.

2.02 FIRE EXTINGUISHERS

- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
- B. Dry Chemical Type Fire Extinguishers: Cast steel tank, with pressure gage.
1. Class 2A10BC.
 2. Metal valves and siphon tubes

2.03 FIRE EXTINGUISHER CABINETS

- A. Semi Recessed: Larsen # AL 2409-R7
1. Door Style: Full Glass
 - a. Metal: Formed aluminum
 - b. Door Glazing: Float glass, clear, 1/8 inch thick, and set in resilient channel glazing gasket.
 - c. Lettering: Die cut, vertical, red
- B. Surface Mounted: Wall bracket Larsen, type 821

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify rough openings for cabinet are correctly sized and located.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install cabinets plumb and level in wall openings, with midpoint of door handle at 39" above finished floor.
- C. Install bracket mounted extinguishers such that the bottom edge of the extinguisher is at 26 1/2" above the finished floor.

- D. Place extinguishers in cabinets.

END OF SECTION

Section 10 51 00

Lockers

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wall Mounted Metal Turnout Lockers
- B. Free Standing Metal Turnout Lockers

1.02 RELATED REQUIREMENTS

- A. Section : Wood blocking and nailers.
- B. Section 09 2116 - Gypsum Board Assemblies

1.03 SUBMITTALS

- A. See Section , for submittal procedures.
- B. Shop Drawings: Indicate locker plan layout, .
- C. Manufacturer's Installation Instructions: Indicate component installation assembly.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Protect locker finish and adjacent surfaces from damage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

2.02 METAL TURNOUT LOCKERS

- A. Quantity: As shown on the drawings.
- B. Size: Standard - 24" W x 20" D x 72" H
- C. Shelves: Two (2) shelves (constructed of high-strength 1/4" wire)
- D. Hooks: Three (3) apparel hooks per locker.
- E. Adjustability: Wire shelves adjustable in 3" increments
- F. Frame: Heavy-duty 1-1/4" tubing

- G. Side & Back Grids: High-strength ¼" wire
- H. Nameplate: 2" H x 16" W custom printed name plate (1 per each locker)
- I. Mounting Brackets: 11 gauge steel
- J. Finish: Powder coat
- K. Color: Red
- L. Accessories: "Gearglove" glove and "Geardryer" turnout coat hanger for each unit.
- M. Top shelf: "Top Side Storage" continuous shelf above all lockers.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify mounting surface is in correct configuration and ready for mounting prior to installation.
- B. In the event of a discrepancy, Notify the Architect immediately.
- C. Do not proceed in areas of discrepancy until all issues have been fully resolved.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install lockers plumb and square.
- C. Secure lockers with anchor devices to suit substrate materials. Minimum Pullout Force:
- D. Install accessories.

END OF SECTION

Section 10 73 16.13

Metal Canopies

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Attached metal canopies.

1.02 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Blocking and backing

1.03 REFERENCE STANDARDS

- A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels; 2013.
- B. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; 2010, with 2013 Supplements and Errata.
- C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- D. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014.
- E. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.
- F. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel; 2015.
- G. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
- H. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- I. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.
- J. ASTM B308/B308M - Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles; 2010.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

- B. Product Data: Submit product data sheets, including material descriptions and finishes, and preparation instructions and recommendations.
- C. Shop Drawings: Prior to commencement of fabrication, submit detailed shop drawings, showing profiles, sections of components, finishes, and fastening details.
- D. Design Data: Submit comprehensive structural analysis of design for the specified loads. Stamp and sign calculations by professional engineer.
 - 1. Use seismic and wind load data as provided by the EOR.
 - 2. Provide reaction loads for review by the EOR.
- E. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in County's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Designer Qualifications: Perform design under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in California.
- B. Manufacturer Qualifications: Company specializing in the manufacture of products similar to those required for this project.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to project site ready for erection.
- B. Package using methods that prevent damage during shipping and storage on site.
- C. Store materials under cover and elevated above grade.

1.07 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Metal Canopies: Correct defective work within a two year period after Date of Substantial Completion.
- C. Finish Warranty: Provide manufacturer's ten year warranty on factory finish against cracking, peeling, and blistering.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Metal Canopies:
 - 1. CityScapes Inc: www.cityscapesinc.com/#sle.
 - 2. Greco Aluminum Railings: www.grecoalrailings.com/#sle.
 - 3. Madison Industries: www.madisonind.com.
 - 4. Mapes Industries; Super Lumideck: <https://mapes.com/#sle>. (Basis of Design)

2.02 METAL CANOPIES

- A. Shop Fabricated Aluminum Canopy
- B. Configuration: Layout and dimensions and canopy clearance as indicated on drawings.
 - 1. Installation: Cantilever-mounted to building structure with tension members.
 - 2. Structural Framing System: Aluminum.
 - 3. Drainage Concept: Water collected in decking conducted into perimeter drain beams and discharged through drain hole.
- C. Performance Requirements:
 - 1. Design and fabricate metal canopy system to resist wind, live, and seismic loads without failure, damage, or permanent deflection in accordance with ASCE 7:
 - a. Loads: As indicated on drawings.
 - 2. Thermal Movement: Design canopy system to accommodate thermal movement caused by ambient temperature range of 120 degrees F and surface temperature range of 180 degrees F without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects on assembly components.

2.03 COMPONENTS

- A. Structural Steel Framing:
 - 1. Columns: ASTM A500/A500M, Grade B, round or rectangular tubing, sized to suit project design load requirements.
 - 2. Base and Top Plates: ASTM A36/A36M, with pre-drilled bolt holes.
 - 3. Beams: Wide flange, ASTM A572/A572M Grade 50.
 - 4. Other Structural Steel Members: ASTM A36/A36M.
- B. Structural Aluminum Framing: Alloy and temper 6063-T5, 6063-T6, or 6061-T6.
 - 1. Extruded Shapes and Tubes: ASTM B221 (ASTM B221M).
 - 2. Rolled or Extruded Structural Shapes: ASTM B308/B308M.
 - 3. Sheet and Plate: Alloy 5052, 5005, or 6061-T651, ASTM B209/B209M.
- C. Covering:
 - 1. Aluminum Decking:
 - a. Interlocking extruded aluminum decking modules.
 - 1) Extruded Decking: ASTM B221 (ASTM B221M), Alloy and temper 6005-T5, 6061-T6, or 6063-T6.
- D. Fascia: Same material as structural framework, 8 inches high.

2.04 SHOP FABRICATION

- A. Provide a complete system ready for erection at project site.
- B. Shop fabricate to the greatest extent possible; disassemble if necessary for shipping.
- C. Fabricate connections for bolt, nut, and washer connectors.

2.05 FINISHES

- A. Aluminum Framing and Decking:
 - 1. High Performance Organic Coatings: AAMA 2604, multiple coats, thermally cured, fluoropolymer system.

2.06 ACCESSORIES

- A. Fasteners, Non-Structural: ASTM F593 stainless steel. or aluminum

PART 3 EXECUTION

3.01 INSTALLATION - CANOPY COVERING

- A. Install in accordance with manufacturer's instructions.
- B. Fasten metal decking to metal support members, aligned level and plumb.
- C. Install fascia panels, trim, and flashing.
- D. Separate dissimilar metals using concealed bituminous paint.
- E. Touch-up damaged finish coating using material provided by manufacturer to match original coating.

3.02 TOLERANCES

- A. Maximum Variation from Level: Plus/Minus 1/8 inch.

3.03 CLEANING

- A. Clean surfaces of dust and debris; follow manufacturer's cleaning instructions for the finish used.

3.04 PROTECTION

- A. Protect canopy after installation to prevent damage due to other work until Date of Substantial Completion.

END OF SECTION

Section 10 75 00

Flagpoles

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum Flagpoles.

1.02 REFERENCE STANDARDS

- A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- B. NAAMM FP 1001 - Guide Specifications for Design Loads of Metal Flagpoles; 2007.

1.03 PERFORMANCE REQUIREMENTS

- A. Flagpole With Flag Flying: Resistant without permanent deformation to 90 miles/hr wind velocity; non-resonant, safety design factor of 2.5.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on pole, accessories, and configurations.
- C. Shop Drawings: Indicate detailed dimensions, base details, anchor requirements, and imposed loads.
- D. Maintenance Data: Provide lubrication and periodic maintenance requirement and schedules.

1.05 QUALITY ASSURANCE

- A. Design flagpole foundation under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in California.
- B. Manufacturing Standards: Provide each flagpole as a complete unit produced by a single manufacturer, including fittings, accessories, bases, and anchorage devices.
- C. Pole Construction: Construct pole and ship to site in one piece.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Spiral wrap flagpole with protective covering and pack in protective shipping tubes or containers.

- B. Protect flagpole and accessories from damage or moisture.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Flagpoles:
 - 1. American Flagpole: www.americanflagpole.com.
 - 2. Concord Industries, Inc: www.concordindustries.com.
 - 3. Substitutions: See Section 01 61 00 - Product Requirements.

2.02 FLAGPOLES

- A. Flagpoles: Designed in accordance with NAAMM FP 1001
 - 1. Material: Aluminum.
 - 2. Mounting: Ground mounted type.
 - 3. Nominal Height: 30 ft; measured from nominal ground elevation.
 - 4. Design: Cone tapered.
 - 5. Halyard: Internal type, electric operation.

2.03 POLE MATERIALS

- A. Aluminum: ASTM B221 (ASTM B221M) , 6063 alloy , T6 temper.

2.04 ACCESSORIES

- A. Finial Ball: Aluminum, 6 inch diameter.
- B. Truck Assembly: Cast aluminum; revolving, stainless steel ball bearings, non-fouling.
- C. Cleats: 9 inch size, aluminum with galvanized steel fastenings, one per halyard.
- D. Cleat Box: Aluminum, with built-in hinge and hasp assembly, attached to pole with tamper proof screws inside box.
- E. Halyard: 5/16 inch diameter polypropylene, braided, white. Provide bronze snap shackles for two flags.

2.05 MOUNTING COMPONENTS

- A. Provide manufacturer's standard base system for the type of flagpole installation required.

2.06 FINISHING

- A. Metal Surfaces in Contact With Concrete: Asphaltic paint.
- B. Aluminum: Mill finish.
- C. Finial: Gold anodized finish.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that concrete foundation is ready to receive work and dimensions are as indicated on shop drawings.

3.02 PREPARATION

- A. Coat metal sleeve surfaces below grade and surfaces in contact with dissimilar materials with asphaltic paint.

3.03 INSTALLATION

- A. Install flagpole , base assembly, and fittings in accordance with manufacturer's instructions.
- B. Electrically ground flagpole installation.

3.04 TOLERANCES

- A. Maximum Variation From Plumb: 1 inch.

3.05 ADJUSTING

- A. Adjust operating devices so that halyard and flag function smoothly.

END OF SECTION

**Section 11 30 13
Residential Appliances**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Kitchen appliances.
- B. Laundry appliances.
- C. Fire station appliances

1.02 RELATED REQUIREMENTS

- A. Section 22 10 05 - Plumbing Piping: Plumbing connections for appliances.
- B. Section 26 05 83 - Wiring Connections: Electrical connections for appliances.

1.03 REFERENCE STANDARDS

- A. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data indicating dimensions, capacity, and operating features of each piece of residential equipment specified.
- C. Shop Drawings: Include plans, elevations, sections, rough-in dimensions, attachments to other work. Include connections to utilities, clearance requirements for equipment access and maintenance.
- D. Copies of Warranties: Submit manufacturer warranty and ensure that forms have been completed in County's name and registered with manufacturer.
- E. Operation and Maintenance Data: For laundry equipment, include emergency, operation and maintenance manuals, including a schedule with Manufacturer's name and model number, and list of factory-authorized service agencies including addresses and telephone numbers.

1.05 QUALITY ASSURANCE

- A. Electric Appliances: Listed and labeled by UL (DIR) and complying with NEMA Standards (National Electrical Manufacturers Association).
- B. Gas Appliances: Bearing design certification seal of American Gas Association (AGA).

1.06 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide five (5) year manufacturer warranty on refrigeration system of refrigerators.
- C. Provide ten (10) year manufacturer warranty on magnetron tube of microwave ovens.
- D. Provide ten (10) year manufacturer warranty on tub and door liner of dishwashers.
- E. Provide three (3) year manufacturer warranty on washer extractor on any part of the equipment assembly and five (5) year manufacturer warranty on main frame, bearing, cylinder or cylinder shaft assembly from date of Substantial Completion.
- F. Provide three (3) year manufacturer parts and labor warranty on ice maker on any part of the equipment assembly and five (5) year manufacturer parts and labor warranty on evaporator assembly. Provide five (5) year manufacturer parts warranty on compressor and air-cooled condenser coil.

PART 2 PRODUCTS

2.01 KITCHEN APPLIANCES

- A. Provide Equipment Eligible for Energy Star Rating: Energy Star Rated.
- B. Refrigerator, French-door, free-standing, bottom-mounted freezer, and frost-free.
 - 1. Bosch Stainless Steel Refrigerator
 - a. Model #B36FD50SNS - 26 CF.
 - b. Size: 35 5/8" W x 70" H x 35 7/16" D
 - 2. Efficiency: Energy Star Certified
 - 3. Sound level: 40 dBA
 - 4. Features: Include glass shelves, automatic icemaker, and in-door water and ice dispenser.
 - 5. Exterior Finish: Stainless steel.
- C. Range: LP gas, free-standing, with standard burners and removable drip pans.
 - 1. Thor Kitchen, 48" wide, natural gas, Model: HDR4803U
 - 2. Size: 48 inches wide by 29 inches deep by 36 inches high.
 - 3. Ovens: Two with electronic ignition.
 - a. Capacity: 4.2 Cu Ft. / 2.5 Cu Ft
 - b. Elements: 3000 W / 2,500 W
 - c. Broiler: 850W + 3500W
 - 4. Burners:
 - a. 18,000 BTU: 2
 - b. 15,000 BTU: 2
 - c. 12,000 BTU: 2
 - d. 15,000 BTU:Griddle
 - 5. Features: Include oven door window and oven light, griddle, backguard, ball bearing oven racks.
 - 6. Exterior Finish: Stainless steel.

- D. Cooking Exhaust: Range hood.
 - 1. VentAHood
 - 2. Size: 54 inches wide.
 - 3. Fan: Three-speed, 655-900cfm cfm
 - 4. Exhaust: fully covered, vented to exterior.
 - 5. Features: Include LED cooktop light and removable grease filter.
 - 6. Exterior Finish: Stainless steel.
 - 7. Sones: 6.3

- E. Microwave: Drawer.
 - 1. GE Appliances,GCST16S1WSS
 - a. Size:12.78 high by 21.34 wide by 17.34 inches deep
 - 2. Capacity: 1.6 cubic ft.
 - 3. Power: 1150 watts.
 - 4. Exterior Finish: Stainless steel.

- F. Waste Disposer, Waste King, Legend Series, Model 8000: stainless steel grinding components, corrosion proof glass filled polyester grinding chamber, overload protection, direct wired, dishwasher connection, drain elbow, drain connector, sound reduction features, and removable splash guard.
 - 1. Power: 1 HP.
 - 2. Capacity: Large.
 - 3. Height: 16-1/16 inch.
 - 4. Depth: 8-5/8 inch.
 - 5. Controls: Wall switch.
 - 6. Voltage: 115 volts, 60 Hz, 4 amps.
 - 7. Sink Flange Kit: Stainless steel.

- G. Dishwasher: Undercounter.
 - 1. Bosch, 800 Series, Model #SHXM78Z54N, stainless steel finish, stainless steel interior, hard food disposer and self-cleaning filter.
 - 2. Tub: Stainless Steel
 - 3. Features: Include rinse aid dispenser, optional no-heat dry, optional water temperature boost, adjustable upper rack, and adjustable lower rack.
 - 4. Noise: 42 DbA
 - 5. Efficiency: Energy Star Certified
 - 6. Finish: Stainless steel.

2.02 LAUNDRY APPLIANCES

- A. Clothes Washer, Type stainless steel washtub, 0.5 HP motor: Front-loading.
 - 1. Size: 3.5 Cu Ft.
 - 2. Controls: Mechanical Controls.
 - 3. Cycles: 9.
 - 4. Motor Speed: Two-speed.
 - 5. Features: Include optional second rinse, bleach dispenser, fabric softener dispenser, sound insulation, and end of cycle signal.
 - 6. Finish: Painted steel, color white.
 - 7. Manufacturers:

- a. Speed Queen FF7011WN
- B. Clothes Washer, Type stainless steel washtub, 0.5 HP motor: Front-loading.
 - 1. Size: 3.2 Cu Ft.
 - 2. Controls: Mechanical Controls.
 - 3. Cycles: 4.
 - 4. Motor Speed: Variable.
 - 5. Features: Include optional second rinse, bleach dispenser, fabric softener dispenser, sound insulation, and end of cycle signal.
 - 6. Finish: Painted steel, color white.
 - 7. Manufacturers:
 - a. Speed Queen TR3006WNWN
- C. Clothes Dryer: Natural gas, stationary pairs with front load washing machine.
 - 1. Size: 7.0 Cu Ft..
 - 2. Controls: mechanical controls, with electronic moisture-sensing dry control.
 - 3. Temperature Selections: Four.
 - 4. Cycles: Include normal, permanent press, knit/delicate, and air only.
 - 5. Cylinder: Stainless Steel
 - 6. Features: Include reversible door, stationary rack, sound insulation, end of cycle signal, and door window.
 - 7. Finish: Painted steel, color white.
 - 8. Manufacturers:
 - a. Speed Queen DF7004BE
 - b. Substitutions: See Section 01 61 00 - Product Requirements.
- D. Clothes Dryer: Electric, stationary pairs with top load washing machine.
 - 1. Size: 7.0 Cu Ft..
 - 2. Controls: mechanical controls, with electronic moisture-sensing dry control.
 - 3. Temperature Selections: Four.
 - 4. Cycles: Include normal, permanent press, knit/delicate, and air only.
 - 5. Cylinder: Galvanized
 - 6. Energy Star Certified
 - 7. Features: Include reversible door, stationary rack, sound insulation, and end of cycle signal.
 - 8. Finish: Painted steel, color white.
 - 9. Manufacturers:
 - a. Speed Queen DR3004WE
 - b. Substitutions: See Section 01 61 00 - Product Requirements.

2.03 FIRE STATION APPLIANCES

- A. Washer Extractor
 - 1. Suspension: Rigid
 - 2. Capacity: 6.14 Cu Ft.
 - 3. Width: 34.1 inches
 - 4. Wash Speed: Variable- 10-50 RPM
 - 5. Extraction Speed: Variable 75-477 RPM
 - 6. Extraction G force: 100 Gs

7. Drive Motor: 5 Hp
 8. Provide all components necessary for Chemical Injection Supply System.
 - a. Automatic flushing
 9. Manufacturer:
 - a. Unimac, Model No. UWT045D30L
- B. Turnout/Hose Dryer
1. Unimac, Fireman's PPE System: Model UTGC6ENG4402W01
 - a. Size: 61-1/8"W x 80-3/8"H x 32-5/8"D
 - b. Capacity: 6 sets Turnout Gear
 - 1) Glove/Boot holders: 15 sets
 - c. Electrical Connection: 208 V, 3 phase
 - d. Airflow: 300 CFM
 - e. Motor HP: 1/8 times two motors
 - f. Control System:
 - 1) Minimum of 5 programable drying cycles
 - 2) Ability to dry up to 555 minutes
 - 3) Ability to cool from 2 minutes to 60 minutes
 - 4) Variable Temperature: 100-150 degrees F (38-66 Celcius)
- C. Detoxification Sauna
1. Size: Standard 62.3 inches wide by 49.9 inches deep by 77.7 inches tall
 2. Power: 20 Amps at 120V, NEMA 5-20
 3. Material: Bass wood
 4. Construction: Solid wood, no glued laminated wood
 5. Bench minimum 20 inches deep full width of unit.
 6. EMF radiation: 0.2 millgaus maximum
 7. Manufacturer:
 - a. Sunlighten; sunlighten.com
 - b. Or approved equal
- D. Breathing Air Cylinder Recharging System (SCBA)
1. Output Pressure: 6,000 psi
 2. Motor: 15 hp, 3 phase
 3. Charge Rate: 13 SCFM (368 L/Min)
 4. Fill positions: 4
 5. Cylinder size: SCBA or SCUBA minimum 31 inch height capacity
 6. Safety:
 - a. NFPA 1901 compliant
 - b. Automatic shut down for low oil pressure and high temperature
 - c. Audible alarm on safety shut down
 - d. Air filter to comply with NFPA s
 7. Control: Remote start/stop
 8. Storage capacity: Four 7,000 psi UN cylinders, racked vertically
 9. Manufacturer:
 - a. Bauer Corp., Bauer Unicus: www.bauercomp.com
 - b. Or approved equal
- E. Ice Maker

1. Capacity: 11.5 cubic feet / 300 pounds
2. Production rate: 548 pounds per 24 hours at 70/50 degrees F
3. Exterior: Stainless steel
4. Air Flow: front in and out with removable air filter
5. Door: hinge upward
6. Accessories: Ice scoop, single system scale water filter.
7. Refrigerant: R-290
8. Energy Star compliant
9. Power: 115V/60/1
10. Manufacturer:
 - a. Hoshizaki America, Inc; KM-522MAK/B-300: www.hoshizakiamerica.com
 - b. Or approved equal

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify utility rough-ins are provided and correctly located.
- B. Do not begin installation until substrates have been properly prepared.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Anchor built-in equipment in place.
- C. Coordinate with specifications in Divisions 15 and 16 power and mechanical requirements and hookup locations prior to rough-in.
- D. Washer Extractor System Startup and Commissioning: Arrange for a local manufacturer's representative to inspect machines prior to startup and operation.

3.03 ADJUSTING

- A. Adjust equipment to provide efficient operation.

3.04 CLEANING

- A. Remove packing materials from equipment and properly discard.
- B. Wash and clean equipment.

END OF SECTION

**Section 12 21 16
Vertical Louver Blinds**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Vertical louver blinds at windows and storefront noted below as identified on the plan and window types.
 - 1. Storefront 134B
 - 2. Storefront 121A

1.02 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Concealed wood blocking for attachment of headrail brackets.
- B. Section 12 21 13 - Horizontal Louver Blinds.

1.03 DEFINITIONS

- A. Light and Privacy Scale:
 - 1. Level Four (4): Diffuses the light and reveals no shape or details to the outside. Provides complete privacy and room-darkening options.

1.04 REFERENCE STANDARDS

- A. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; 2015.
- A. WCMA A100.1 - Safety of Corded Window Covering Products; Current Edition, Including All Revisions.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Certification: Provide certification that product complies with WCMA A100.1.
- D. Shop Drawings: Indicate headrail location and schematic wire diagram of electronic controls and motors.

- E. Selection Samples: For vanes, color chips or material samples representing manufacturer's full range of available colors and patterns.
- F. Verification Samples: For vanes, minimum size 6 inches square, representing actual materials, color and perforations.
- G. Operation and Maintenance Data: Manufacturer's data on repair and replacement of vanes, chains, and other parts.
- H. Maintenance Materials: Furnish the following for County's use in maintenance of project.
 - 1. See Section 01 61 00 - Product Requirements, for additional provisions.
 - 2. Extra Vanes: 20 of each type and size.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of this type with minimum 3 years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. If blinds are delivered early and stored at the project, deliver in unopened containers; handle and store in such a manner to protect them from damage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Vertical Louver Blinds:
 - 1. Hunter Douglas: www.hunterdouglas.com.
 - 2. Levolor Contract: www.levolorcontract.com.
 - 3. Graber, division of Springs Window Fashions: www.graberblinds.com.
 - 4. Substitutions: See Section 01 61 00 - Product Requirements.

2.02 BLINDS AND BLIND COMPONENTS

- A. Vertical Louver Blinds: Horizontal travel, vertical vane louver units complete with tracks, pivot and traversing mechanisms, and accessories, as follows:
 - 1. Louvers: Fabric in-fill PVC louver blades of the specified size.
 - 2. Operation: Manual.
 - 3. Direction of Travel: As indicated on the drawings.
 - 4. Mounting: Outside (face of jambs).
 - 5. Cord and Chain Operation: Comply with WCMA A100.1.
- B. Tracks: Channel tracks as required for type of operation, extruded aluminum with clear anodized finish, with end caps.

1. Provide a single tracks to span all window of the same type in a row, including wall space between.
 2. Vane Rotation: Chain driven direct rotation by activating tilt gear within end cap assembly in turn actuating tilt rod and worm-and-spur gears in carrier trucks.
 3. Operating Components: Internally mounted heavy-duty extruded aluminum tilt rod, vane carriers, and other components required for proper performance and designed for smooth, quiet, trouble free operation.
 4. Pivot Mechanism: Geared for synchronous 180 degrees rotation of vanes and type of operation indicated.
 5. Vane Carriers: Metal carriers with ball-bearing wheels or thermoplastic trucks, equipped with linkages or other devices to ensure positive spacing of vanes.
 6. Tilt Chain: Nickel plated brass beaded ball chain, minimum 1/8 inch diameter; locate at drawback side of units as indicated.
- C. Fabric Vanes: Integrally colored, extruded PVC vanes with fabric infill; flat, 3-1/2 inches (80mm) wide.
1. Fabric: Manufacturer's standard flame resistant fabric.
 2. Flammability: Comply with NFPA 701.
 3. PVC Color: As selected by Architect from manufacturer's full range of colors.
 4. PVC Texture: Smooth.
 5. Fabric Color and Texture: As selected by Architect from manufacturer's full range of colors.
- D. Brackets and Mounting Hardware: As recommended by manufacturer for the mounting configuration and span indicated; provide manufacturer's standard L- bracket with clip for outside mounting and clip only for inside mounting.
- E. Valances: To match vane design and color.
1. Style: As selected by Architect from blind manufacturer's full selection.

2.03 FABRICATION

- A. Field measure finished openings prior to ordering or fabrication.
- B. Fabricate blinds to fit openings within specified tolerances.
1. Vertical Dimensions: Fill openings from head to sill with 1/2 inch space between bottom of vanes and finish floor.
 2. Horizontal Dimensions - Outside Mounting: Cover window frames, trim, and casings completely.
- C. Dimensional Tolerances: Fabricate blinds to within plus/minus 1/8 inch of intended dimensions.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not start installation before openings are finished and all finishes have been completed; do not install until painting is completed.

- B. Field measure finished openings prior to ordering or fabrication.

3.02 PREPARATION

- A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- B. Coordinate the work with window installation and placement of concealed blocking to support blinds.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions using mounting style as indicated.
- B. Installation Tolerances:
 - 1. Maximum Offset From Level: 1/16 inch.
- C. Adjust blinds for smooth operation.
- D. Replace blinds that exceed specified dimensional tolerances at no extra cost to County.

3.04 CLEANING

- A. Clean installed work to like-new condition.

3.05 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

End of Section

Section 12 24 00
Window Shades

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Room darkening and sunscreen double roller window shades and accessories.

1.02 RELATED REQUIREMENTS

- A. Section : Concealed wood blocking for attachment of headrail brackets.
- B. Section : Substrate for window shade systems.

1.03 REFERENCE STANDARDS

- A. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; 2015.
- B. WCMA A100.1 - Safety of Corded Window Covering Products; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Sequencing:
 - 1. Do not fabricate shades until field dimensions for each opening have been taken.
 - 2. Do not install shades until final surface finishes and painting are complete.

1.05 SUBMITTALS

- A. See Section , for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets including preparation instructions and recommendations, materials, finishes, fabrication details, dimensions, profiles, mounting requirements, and accessories.
- C. Selection Samples: Include .
- D. Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- E. Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in County's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than years of experience.
- B. Installer Qualifications: Company specializing in performing work of this type with minimum five (5) years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver shades in manufacturer's unopened packaging, labeled to identify each shade for each opening.
- B. Handle and store shades in accordance with manufacturer's recommendations.

1.08 FIELD CONDITIONS

- A. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.09 WARRANTY

- A. See Section , for additional warranty requirements.
- B. Provide manufacturer's warranty from Date of Substantial Completion, covering the following:
 - 1. Shade Hardware: Twenty-five years.
 - 2. Fabric: Ten years.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Manually Operated Roller Shades:
 - 1. Draper, Inc: www.draperinc.com/#sle.
 - 2. Hunter Douglas: www.hunterdouglas.com.
 - 3. MechoSystems: www.mechoshade.com.
- B. Source Limitations: Furnish products produced by a single manufacturer and obtained from a single supplier.

2.02 WINDOW SHADE APPLICATIONS

- A. Shades at all windows and storefront not receiving vertical louvers, including shades on storefront doors: Sheer shades.
 - 1. Exception: No shades or vertical louvers are required at windows or storefront in Apparatus Bay.
 - 2. Type: Roller shades.
 - 3. Operation: Manual.

- B. Blackout Shades at Room number 125, 126, 127, 129, 130, 132: Double solar and blackout shade cloth.
 - 1. Type: Double roller shades.
 - 2. Operation: Manual.

2.03 ROLLER SHADES

- A. Roller Shades: Fabric roller shades complete with mounting brackets, roller tubes, hembars, hardware and accessories.
 - 1. Drop: .
- B. Fabric: Non-flammable, color-fast, impervious to heat and moisture, and able to retain its shape under normal operation.
 - 1. Sheer Shades: Reduce glare yet still reveal considerable details to the outside; no privacy; Openness Factor greater than 1 percent.
 - 2. Blackout Shades: Block virtually all the light; Openness Factor equal to zero (0).
 - 3. Flammability: Pass NFPA 701 large and small tests.
- C. Roller Tubes: As required for type of operation.
 - 1. Fabric Attachment: Utilize .
- D. Hembars and Hembar Pockets: Exposed hembar with light seal for blackout shades. Wall thickness designed for weight requirements and adaptation to uneven surfaces, to maintain bottom of shade straight and flat.
- E. Manual Operation for Interior Shades: ; .

2.04 ACCESSORIES

- A. Fascias: Size as required to conceal shade mounting.
- B. Brackets and Mounting Hardware: As recommended by manufacturer for mounting configuration and span indicated.
- C. Fasteners: Non-corrosive, and as recommended by shade manufacturer.

2.05 FABRICATION

- A. Field measure finished openings prior to ordering or fabrication.
- B. Fabricate shades to fit openings within specified tolerances.
 - 1. Vertical Dimensions: Fill openings from head to sill with space between bottom bar and .
 - 2. Horizontal Dimensions - Outside Mounting: Cover window frames, trim, and casings completely.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine finished openings for deficiencies that may preclude satisfactory installation.
- B. Start of installation shall be considered acceptance of substrates.

3.02 PREPARATION

- A. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under the project conditions.
- B. Coordinate with window installation and placement of concealed blocking to support shades.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions and approved shop drawings, using mounting devices as indicated.
- B. Installation Tolerances:
 - 1. Maximum Offset From Level:
- C. Replace shades that exceed specified dimensional tolerances at no extra cost to County.
- D. Adjust level, projection and shade centering from mounting bracket. Verify there is no telescoping of shade fabric. Ensure smooth shade operation.

3.04 CLEANING

- A. Clean soiled shades and exposed components as recommended by manufacturer.
- B. Replace shades that cannot be cleaned to "like new" condition.

3.05 CLOSEOUT ACTIVITIES

- A. See Section , for closeout submittals.
- B. Demonstration: Demonstrate operation and maintenance of window shade system to County's personnel.

3.06 PROTECTION

- A. Protect installed products from subsequent construction operations.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

3.07 MAINTENANCE

End of Section

Section 12 36 00

Countertops

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Countertops for architectural cabinetwork.
- B. Wall-hung counters and vanity tops.

1.02 RELATED REQUIREMENTS

1.03 REFERENCE STANDARDS

- A. ANSI A208.2 - Medium Density Fiberboard (MDF) for Interior Applications; 2022.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- D. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026.
- F. ISFA 2-01 - Classification and Standards for Solid Surfacing Material; 2013.
- G. ISFA 3-01 - Classification and Standards for Quartz Surfacing Material; 2013.
- H. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.
- I. NSI (DSDM) - Dimensional Stone Design Manual, Version VIII; 2016.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Specimen warranty.

- C. Shop Drawings: Complete details of materials and installation, including joint details, joint locations, anchor and support details and edge and profile details; combine with shop drawings of cabinets and casework specified in other sections.
- D. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, minimum size 6 inches square, representing actual product, color, patterns, sealant and grout, where occurs.
- F. Test Reports: Chemical resistance testing, showing compliance with specified requirements.
- G. Installation Instructions: Manufacturer's installation instructions and recommendations.
- H. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than five years of documented experience and approved by manufacturer.
- B. Fabricator Qualifications: Skilled workers who custom-fabricate specified countertops similar to the work of this project. Must have ten (10) years minimum continuous operating experience fabricating and installing the specified countertop.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver no components to Project site until areas are ready for installation.
- B. Store products indoors in manufacturer's unopened packaging until ready for installation.
- C. Handle materials to prevent damage to finished surfaces.
- D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.07 FIELD CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.01 COUNTERTOPS

- A. Plastic Laminate Countertops: High-pressure decorative laminate (HPDL) sheet bonded to substrate.

1. Laminate Sheet: NEMA LD 3, Grade HGS, 0.048 inch nominal thickness.
 - a. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
 - b. NSF approved for food contact.
 - c. Wear Resistance: In addition to specified grade, comply with NEMA LD 3 High Wear Grade requirements for wear resistance.
 - d. Finish: Matte or suede, gloss rating of 5 to 20.
 - e. Surface Color and Pattern: To be selected from manufacturer's full line.
 2. Exposed Edge Treatment: Square, substrate built up to minimum 1-1/4 inch thick; covered with matching laminate.
 3. Back and End Splashes: Same material, same construction.
- B. Galvanized Steel Countertops: ASTM A653/A653M steel galvanized sheet; 14 gage, 0.0785 inch nominal sheet thickness.
1. Splash Dimensions: 4 inch high by 1 inch thick, unless otherwise indicated.
 2. Back and End Splashes: Same material; welded 1/4 inch radius coved joint to countertop; square top edge with 1 inch wide top surface and minimum 1/2 inch turndown;
 3. Exposed Edge Shape: Straight turndown with return; 1-1/2 inch high face, 1/2 inch return to face of case ; reinforced with hardwood or steel.
 4. All fabrications, structural clips and other metal fabrication products shall be galvanized per ASTM A123/A123M and ASTM A153/A153M.
 5. All bolts and fasteners shall be galvanized per ASTM A153/A153M.
- C. Natural Quartz and Resin Composite Countertops: Sheet or slab of natural quartz and plastic resin over continuous substrate.
1. Flat Sheet Thickness: 1-1/4 inch, minimum.
 2. Natural Quartz and Resin Composite Sheets, Slabs and Castings: Complying with ISFA 3-01 and NEMA LD 3; orthophthalic polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard stone fabrication tools; no surface coating; color and pattern consistent throughout thickness.
 - a. Manufacturers:
 - 1) Cambria Company LLC: www.cambriausa.com/#sle.
 - 2) Cosentino North America: www.cosentino.com/#sle.
 - 3) Dal-Tile Corporation: www.daltile.com/#sle.
 - b. Shop fabricate components to the greatest extent practical in sizes and shapes indicated; comply with NSI (DSDM).
 - c. Finish on Exposed Surfaces: Polished.
 3. Other Components Thickness: 3/4 inch, minimum.
 4. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.

2.02 MATERIALS

- A. Medium Density Fiberboard for Supporting Substrate at all countertops: ANSI A208.2. To match substrate specified for Architectural Cabinetwork.
- B. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.

- C. Cove Molding for Top of Splashes: Rubber with semi-gloss finish and T-spline to fit between splash and wall; 1/2 inch by 1/2 inch; color as selected.
- D. Joint Sealant: Mildew-resistant silicone sealant, clear.

2.03 FABRICATION

- A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
 - 1. Join lengths of tops using best method recommended by manufacturer.
 - 2. Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall.
 - 3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.
- B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
 - 1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
 - 2. Height: 4 inches, unless otherwise indicated.
- C. Galvanized Steel: Fabricate tops up to 144 inches long in one piece including nosings and back and end splashes; accurately fitted mechanical field joints in lengths over that dimension are permitted.
 - 1. Weld joints; grind smooth and polish to match.
 - 2. Provide galvanized steel hat channel stiffeners to underside as required.
 - 3. Provide wall clips for support of back/end splash turndowns.
 - 4. Sound Deadening: Apply water resistant, fire resistant sound deadening mastic to entire bottom surface.
 - 5. Repair paint: ZRC cold galvanizing compound or equal.
- D. Cutouts and Holes:
 - 1. Under-Counter Fixtures: Make cutouts for under-counter fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
 - 2. Counter-Mounted Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations.
 - 3. Fittings: Drill countertops in shop for plumbing fittings, such as counter-mounted soap dispensers and similar items.
- E. Wall-Mounted Counters: Provide skirts, aprons, brackets, and braces as indicated on drawings, finished to match.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.

- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

- A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.
- B. Attach plastic laminate countertops using screws with minimum penetration into substrate board of 5/8 inch.
- C. Attach stainless steel countertops using stainless steel fasteners and clips.
- D. Seal joint between back/end splashes and vertical surfaces.
 - 1. Where indicated use rubber cove molding.
 - 2. Where applied cove molding is not indicated use specified sealant.

3.04 TOLERANCES

- A. Variation From Horizontal: 1/8 inch in 10 feet, maximum.
- B. Offset From Wall, Countertops: 1/8 inch maximum; 1/16 inch minimum.
- C. Field Joints: 1/8 inch wide, maximum.

3.05 CLEANING AND PROTECTION

- A. Clean countertops surfaces thoroughly.
- B. Protect installed products until completion of project.
- C. Touch-up, repair or replace damaged products before Date of Substantial Completion.

End of Section

Section 12 48 13
Entrance Floor Mats and Frames

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Entrance floor mat and frame assembly
- B. Recessed mat frames.

1.02 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating properties of walk-off surface, component dimensions and recessed frame characteristics.
- C. Shop Drawings: Indicate dimensions and details for recessed frame.
- D. Maintenance Data: Include cleaning instructions, stain removal procedures.

1.03 WARRANTY

- A. Provide manufacturer's written five year warranty from date of shipment.
- B. Repair defects, or replace with new materials, faulty materials or fabrication developed during the warranty period at no expense to Owner.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Floor Mats:
 - 1. Activar Construction Products Group - JL Industries; _____: www.activarcpg.com/#sle.
 - 2. Kadee Industries: www.kadeeindustries.com/#sle.
 - 3. Nystrom, Inc; Roll-up GRATEdesign: www.nystrom.com/#sle. (Basis of Design)
 - 4. Substitutions: See Section 01 61 00 - Product Requirements.

2.02 FLOOR MATS

- A. Modular Entrance Mat: Extruded aluminum planks with polyethylene foam backing, carpet tread inlays running perpendicular to traffic flow, and perimeter trim for recessed installation.
 - 1. Thickness: 0.75 inches.
 - 2. Tread Surfaces: Rugged Scrub.
 - 3. Colors: As selected by Architect from manufacturer's standard selection.

- B. Recessed Frame: 3/4 inch deep clear anodized aluminum with anchoring features.

2.03 FABRICATION

- A. Construct recessed mat frames square, tight joints at corners, rigid. Coat surfaces with protective coating where in contact with cementitious materials.
- B. Fabricate mats in single unit sizes; fabricate multiple mats where indicated on drawings.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify floor surface is flat and level meeting a tolerance of 1/8 inch over 10 feet in accordance with ACI 302.
- B. Verify that floor opening for mats are ready to receive work.

3.02 PREPARATION

- A. Mats: Verify size of floor recess before fabricating mats.
- B. Vacuum clean floor recess.

3.03 INSTALLATION

- A. Install products in accordance with manufacturer's instructions in locations shown.
- B. Install frames to achieve flush plane with finished floor surface.
- C. Install walk-off surface in floor recess flush with finish floor after cleaning of finish flooring.

3.04 TOLERANCES

- A. Maximum Gap Formed at Recessed Frame From Mat Size: 1/4 inch.

3.05 PROTECTION

- A. Upon completion of frame installations, provide temporary filler of plywood or fiberboard in grille recesses, and cover frames with plywood protective flooring. Maintain protection until construction traffic has ended and Project is near time of Substantial Completion.
- B. Install product when no further wheeled construction traffic will occur and wet type operations including painting and decorating and complete.

3.06 SCHEDULES

- A. Roll up Mat: Aparatus Bay, at door #108A see floor plan.

End of Section

Section 21 00 00
Fire Suppression System

PART 1 GENERAL

1.01 Description

- A. Related Documents:
 - 1. The other Contract Documents complement the requirements of this Section and apply to this Section.
 - 2. Division 1 - General Requirements and Section 23 00 13 apply to the Work of this Section.
 - 3. Where requirements of this Section exceed those in other Contract Documents, Contractor(s) shall comply with the requirements of this Section.
- B. Codes and Regulations:
 - 1. Comply with regulations and requirements of the local Fire Marshall, local building officials and other authorities having jurisdiction.
 - 2. Comply with requirements contained in NFPA Standard 13, Installation of Sprinkler Systems, 2019 edition for equipment, specialties, accessories, installation, and testing.
 - 3. In the event of conflict between or among specified requirements and pertinent regulations, the more stringent requirements will govern when so directed by the Architect.
- C. Included: Work includes, but is not necessarily limited to the following.
 - 1. The Work covered by this shall include furnishing all labor, material, equipment and services to design, install and place in operation, a complete Wet Pipe Sprinkler System in compliance with NFPA Standards and based on current fire hydrant flow test report.
 - 2. Provide a NFPA 13 hydraulically calculated design which is complete in all regards including, but not necessarily limited to:
 - a. Connection to water main including required valves, fittings, and similar items.
 - b. Underground piping pertaining to the Work of this Section including required pipe, valves, thrust blocks, trenching, backfilling, and similar items.
 - c. Supply Riser, test and drain with required appurtenances and accessories.
 - d. A complete overhead wet sprinkler system.
 - e. Access panels for concealed valves.
 - 3. Obtain and pay for all licenses, permits, hydrant flow test and report, and fees required for this Work when applicable.
 - 4. Obtain required approvals for the Fire Suppression System in accordance with the requirements of the Authorities having jurisdiction.
- D. Related work not included in the specification section:
 - 1. All electrical Work, wiring, fire alarm Work, fire extinguishers, monitoring systems and smoke detectors are by others.
 - 2. Painting of exposed pipe.

1.02 Quality Assurance

- A. Installer's responsibilities include designing, fabricating, and installing Fire Suppression Systems and providing professional engineering services needed to assume engineering responsibility. Calculations shall be based on result of Fire-Hydrant flow test.
- B. Welding:
 - 1. Comply with Section IX of the ASME Boiler and Pressure Vessel Code.
 - 2. Comply with the applicable requirements of AWS B2.1, specifications for Qualification of Welding Procedures and Welders for Piping and Tubing.

1.03 Performance Requirements

- A. Standard piping system component working pressure: listed for 175 PSIG.
- B. Fire Suppression Sprinkler System design shall be approved by the authorities having jurisdiction.
- C. Hazard classification per NFPA 13, Appendix A.
- D. Minimum Density:
 - 1. Light-Hazard Occupancy: 0.10 GPM/Sq. Ft. over 1500 Sq. Ft.
 - 2. Ordinary – Hazard, Group 1 Occupancy: 0.15 GPM/Sq. Ft. over 1500 Sq. Ft.
- E. Fire Suppression piping shall be seismically braced per NFPA – 13, Seismic Zone 4. Calculations and selection and type of hangers and supports shall be included on the drawings.

1.04 Submittals And Record Drawings

- A. Comply with pertinent provisions of Architectural Sections.
- B. Product Data: Within 35 calendar days after the Contractor(s) has received the "Notice to Proceed", submit 6 copies of the following:
 - 1. Materials and equipment list of items proposed to be provided under this Section.
 - 2. Design drawings including Hydraulic Calculations, stamped as having been approved by the Authority having jurisdiction, showing the complete sprinkler system. The location of drain line terminations shall be approved by the Fire Marshal or his agent.
 - 3. A plan drawing, stamped as having been approved by the Authority having jurisdiction, showing location of underground connections, control valves, and related items.
 - 4. Fire Hydrant Flow Test Report.
 - 5. Details and sections as required to clarify the design.
 - 6. Plans shall conform to appropriate NFPA Standards.
- C. Record Drawings:
 - 1. Include a copy of the Record Drawings in each copy of the operation and maintenance manual described below.

- D. Upon completion of this portion of the Work, and as a condition of its acceptance, deliver to the Architect two (2) copies of an operation and maintenance manual compiled in accordance with the provisions of Architectural Sections of these Specifications.

1.05 Product Handling

- A. Comply with pertinent provisions of Architectural Sections.

1.06 Warranty

- A. Contractor shall warrant the installation free from defects for a period of one year from filing Notice of Completion. Correct any deficiencies developing during this period free of charge.
- B. The installer shall be responsible for all damage to any part of the premises caused by leaks or breaks in the piping or equipment furnished and/or installed under this Section of the Work for a period of one year after acceptance of Work.
- C. The above warranties are in addition to and not a limitation of other rights the Owner may have against the contractor under Contract Documents.

PART 2 PRODUCTS

2.01 Piping, Fittings And Joints

- A. Below grade fire service piping and fittings shall comply with AWWA standards and be “listed: for Fire Protection Service.

Acceptable Materials:

1. PVC plastic pipe, CL150, CL200 conforming to AWWA C900 with bell spigot ends and factory installed rubber-sealing ring. Fittings: ductile iron, gray iron, or cast iron mechanical joints with approved manufactured pipe and fitting restraint system.
2. Ductile iron pipe, bell and spigot, factory provided rubber gasket conforming to ANSI/AWWA C151/A.21.51. Fittings: ductile iron or gray-iron mechanical joints conforming to ANSI/AWWA C110/A21.10 with approved manufactured pipe and fitting restraint system.
3. Refer to NFPA-13 Materials Section for other acceptable piping types and systems.

- B. Above grade fire protection system pipe, tube, and fittings shall be approved and “listed” for use in fire protection systems.

Acceptable Materials: As listed in NFPA-13 piping specifications for pipe, tube materials and dimensions.

2.02 Sprinkler Heads

- A. Sprinklers shall be UL listed or FMG approved, with 175-psig minimum pressure rating. Sprinklers shall have 250-psig pressure rating if sprinklers are components of high-pressure piping system.
- B. Available Manufacturers:
 - 1. Central Sprinkler Corp.
 - 2. Globe Fire Sprinkler Corporation.
 - 3. Grinnell Fire Protection.
 - 4. Reliable Automatic Sprinkler Co., Inc..
 - 5. Star Sprinkler Inc.
 - 6. Victaulic.
 - 7. Viking Corp.
- C. Automatic Sprinklers: With heat-responsive element complying with the following:
 - 1. UL 199, nonresidential applications.
 - 2. US 1626, for residential applications.
 - 3. UL 1767, for early-suppression, fast-response applications.
- D. Sprinkler types and categories: Nominal ½ inch orifice for “Ordinary” temperature classification rating, unless otherwise indicated or required by application.
 - 1. Orifice: ½ inch, with discharge coefficient K between 5.3 and 5.8.
 - 2. Orifice: 17/32, with discharge coefficient K between 7.4 and 8.2.
- E. Sprinkler types, features, and options as follows:
 - 1. Concealed ceiling sprinklers, including cover plate.
 - 2. Extended-coverage sprinklers, with automatic open and shutoff feature.
 - 3. Flow-coverage sprinklers.
 - 4. Flush ceiling sprinklers, including escutcheon.
 - 5. High-pressure sprinklers.
 - 6. Institution sprinklers, made with a small, breakaway projection.
 - 7. Open sprinklers.
 - 8. Pendent sprinklers.
 - 9. Pendent, dry-type sprinklers.
 - 10. Quick-response sprinklers.
 - 11. Recessed sprinklers, including escutcheon.
 - 12. Sidewall sprinklers.
 - 13. Sidewall, dry-type sprinklers.
 - 14. Upright sprinklers.
- F. Sprinkler Finishes: Chrome plated, bronze and painted.
- G. Special Coatings: Wax, lead, and corrosion-resistant paint.
- H. Sprinklers Escutcheons: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers.
 - 1. Ceiling Mounting: Chrome-plated steel, one piece, flat.
 - 2. Sidewall Mounting: Chrome-plated steel, one piece flat.
- I. Sprinkler Guards: Wire-cage type, including fastening device for attaching to sprinkler.

- J. Furnish spare heads, cabinet and tool per NFPA-13

2.03 Security, Signs, Tags And Charts

- A. Security: Provide chain, padlock or other tamper proof device connected to the Fire Alarm System for each manually operated shutoff valve required to be in the open position.
- B. Signs: Provide identification signs of standard design, fastened securely at designated locations in accordance with NFPA No. 13.
- C. Tags: Provide 2" diameter brass tags, stamped with designation numbers, secured with #12 gage copper wire to spindle of control valves.
- D. Charts:
 - 1. Provide two copies of the "As-Built" sprinkler system diagram, giving the designated number, function, and location of each valve.

2.04 Pipe Hangers/Earthquake Protection

- A. Provide Factory Mutual listed hangers, rods, inserts, and accessories by Grinnel, Tolco or equal. Design and install hangers and supports for seismic Zone 4.

2.05 Supply Riser

- A. The Supply Riser shall be installed where schematically shown on the Drawings or directed by the Fire Marshall and be complete with appurtenances and accessories required by NFPA.
- B. All control valves shall be "listed" indicating type installed with tamper monitoring device and connected to the Fire Alarm System.

2.06 Fire Department Connection

- A. When required, appropriately lettered wall or free standing Fire Department Connection(s) shall be provided where schematically shown on the Drawings.
- B. Wall-Type, Fire Department Connection: UL 405, 175- psig minimum pressure rating; with corrosion-resistant-metal body with brass inlets, brass wall escutcheon plate, brass lugged caps with gaskets and brass chains, and brass lugged swivel connections. Include inlets with threads according to NFPA 1963 and matching local fire department sizes and threads, outlet with pipe threads, extension pipe nipples, check devices or clappers for inlets, and escutcheon plate with marking similar to "AUTO SPKR & STANDPIPE."
 - 1. Type: Flush, with two inlets and square or rectangular escutcheon plate.
 - 2. Type: Exposed, projecting with two inlets and round escutcheon plate.
 - 3. Finish: Polish chrome-plated, Rough chrome plated, Polished brass.
- C. Exposed, Freestanding-Type, Fire Department Connection: UL 405, 175-psig minimum pressure rating; with corrosion-resistant-metal body, brass inlets with threads according to NFPA 1963 and matching local fire department sizes and threads, and bottom outlet

with pipe threads. Include brass lugged caps, gaskets, and brass chains; brass lugged swivel connection and drop clapper for each hose-connection inlet; 18-inch high, brass sleeve; and round, floor, brass escutcheon plate with marking "AUTO SPKR & STANDPIPE"

1. Finish Including Sleeve: Polished chrome-plated, Rough chrome-plated, Polished brass.

2.07 Post Indicator Valve

- A. A Post Indicator Valve shall be provided where schematically shown on the Drawings. The valve shall be monitored for tampering and connected to the Fire Alarm System.

2.08 Double Check Valve Assembly

- A. An Approved Double Check Valve Assembly shall be provided where schematically shown on the Drawings in accordance with the standards of the local water-servicing agency. The assembly shall be monitored for tampering and connected to the Fire Alarm System.

2.09 Fire Hydrant(S)

- A. Provide fire hydrant(s) with shut-off valve and fittings to meet the local Building Department Engineering standards. Locate as shown on the Drawings.

2.10 Water Main Connections

- A. Water Main Connections shall be provided where schematically shown on the Drawings per local Building Department or Water District Engineering Standards.

2.11 Wall And Floor Penetration Sleeves

- A. Fire walls and floors:
 1. Wall and floor penetrations shall be protected with a U.L. approved fire rated system. The system shall be per the Drawings Details, and or manufacturer's installation instructions.
 2. Fire stopping materials by Hilti, Metacaulk, or Dow-Corning are considered equal. The material shall be the same as called out for the U.L. approved system.
- B. Poured concrete walls and floors.
 1. Pipes penetrating poured concrete walls and floors shall be protected by providing sleeves per NFPA standards but not less than the following:
 - a. A Schedule 40 PVC sleeve one (1) size larger than the pipe
 - b. Protection shall end flush with the wall or floor surface.
- C. All walls:
 1. Piping passing through walls exposed to view shall be provided with chrome plated split-ring escutcheon plates in finished areas. Brass or galvanized escutcheon plates may be used elsewhere.
- D. At Floors:

1. Pipe sizes 3½" and smaller shall have pipe sleeves 2" larger than the pipe. For Pipes 4" and larger the pipe sleeve shall be 4" larger than the pipe.

2.12 General

- A. Provide other materials, not specifically described, but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.
- B. All fire protection equipment or materials shall be U.L. listed for fire protection use.

PART 3 EXECUTION

3.01 Surface Conditions

- A. Examine the areas and conditions under which Work of this Section will be performed. Conditions detrimental to timely and proper completion of the Work shall be brought to the attention of the Architect before the installation of any materials. Do not proceed until unsatisfactory conditions are corrected. Incorrectly installed materials requiring changes will be at Contractor's expense.

3.02 Installation - General

- A. Coordinate as necessary with other trades to assure proper and adequate provision in the Work of those trades for interface with the Work of this Section.
- B. Install the Work of this Section in strict accordance with the approved design drawings and the requirements of the Authority having jurisdiction.
- C. Perform trenching and backfilling required for the Work of this Section in strict accordance with Section 23 00 13, pipe manufactures guidelines, and Division 2 Earthwork.
 1. As a minimum, depth of cover of piping shall be 30-inches (minimum) and 36-inches (minimum) under driveways and 48-inches (minimum) under railroad tracks.
 2. Backfill shall be well tamped in layers. No ashes, cinders, refuse, organic or other corrosive materials shall be used as backfill material.
- D. In area having ceilings, conceal all pipes unless directed otherwise by the Architect.
- E. In non-ceiling areas, pipe shall be exposed and routed in the truss space. Where it is not practical to run in the truss space, hold pipes to underside of trusses.
- F. All sprinkler heads shall be arranged in straight rows in both directions, as much as possible. Refer to architects' notes for sprinkler head arrangement.
- G. Do not locate sprinkler heads in any luminous ceiling. Methods for sprinklering such areas shall comply with NFPA.

- H. Sprinkler heads located where they may easily be damaged, shall be fitted with approved guards.
- I. Cut piping accurately to job measurements and install without springing or forcing. Ream cut pipe to full inside diameter. Insure all filings have been removed from inside of the pipe. Install piping generally square with building, free of traps or air pockets and true to line and grade. Do not install piping in any locations where, in the Architect's opinion, it will interfere with the use of the building; where space is inadequate, notify Architect in time to avoid unnecessary Work. Coordinate and install all piping system without interfering with other trades.
- J. Make up screwed joints with anti-seize thread lubricant applied to male threads only. Threads shall be American-Standard pipe threads.
- K. All low points of the sprinkler system shall have provisions for drainage per NFPA 13. Drain piping shall be run to accessible places approved by the Architect.
- L. Support and brace piping to protect from earthquake damage from structure in accordance with NFPA 13. Do not support piping from ductwork, other pipes, or by resting on the structure.
- M. Provide access panels per Section 23 00 13 for all concealed valves.
- N. The Fire Sprinkler Piping spacing of vertical supports, lateral bracing, and the details of the lateral bracing must comply with NFPA Standards.
- O. All tees, plugs, caps, bends, and hydrant branches on pipe-installed underground shall be restrained (pipe clamps and tie-rods, thrust blocks, locked mechanical or push-on joints, mechanical joints utilizing set screw retainer glands, or other approved methods) against movement.
- P. All piping shall be painted in compliance of pertinent Architectural Sections.

3.03 Closing In Uninspected Work

- A. Work in furred areas and below grade and slabs shall not be concealed until such Work has been inspected and approved by the inspecting Authorities. If such Work is concealed without inspection and approval, the installer shall be financially responsible for all Work required to open and restore the concealed areas in addition to any required modification to the system.

3.04 Cleanup

- A. During the process of the Work, premises shall be kept reasonably free of all debris, cutting and waste material resulting from the Work under this Section. All such debris and rubbish shall be removed from the site. Upon completion and final acceptance of the Work, all debris, rubbish and left-over materials, tools, and equipment shall be removed from the site.

3.05 Testing And Inspection

- A. Upon completion of the installation, provide necessary personnel and equipment and test and re-test the complete system making adjustments as required, and secure all necessary approvals.
 - 1. Test the system at 200 psi for two (2) hours per NFPA 13.
 - 2. The underground system shall be flushed per NFPA 13, and tested before connection with the overhead section. Backfill the trench between joints before pressure testing to prevent pipe movement.
 - 3. Post Indicating Valves (PIV) shall be tested to insure that the “targets” (OPEN, CLOSED) are clearly identified when valve is opened and closed.
- B. The Contractor shall arrange and pay for all necessary or required inspections by the governmental agencies having jurisdiction to ensure the Work outlined in the Drawings and Specifications complies with the codes. The Architect shall be notified when the Contractor has arranged for inspections.
- C. When the system has been completely approved, secure a Test Certificate from Authority having jurisdiction, and forward two (2) copies of the Certificate to the Architect.

3.06 Disinfection

- A. Purge sprinkler piping system including underground system.
- B. Provide water sample to certified water testing laboratory for initial analysis and disinfecting procedure.
- C. Perform purge and disinfecting procedure in accordance with water testing laboratory.
- D. Submit final Water Test Report.

END OF SECTION 21 00 00

Section 22 00 00
Plumbing

PART 1 GENERAL

1.01 Description

- A. Related Documents:
 - 1. The other Contract Documents complement the requirements of this Section and apply to this Section
 - 2. Division 1 - General Requirements and Section 23 00 13 apply to the Work of this Section.
 - 3. Where requirements of this Section exceed those in other Contract Documents, Contractor shall comply with the requirements of this Section.
- B. Codes and Regulations:
 - 1. California Plumbing Code (CPC).
 - 2. California Mechanical Code (CMC).
 - 3. California Building Code (CBC).
 - 4. California Green Building Standard Code.
 - 5. National Fire Code (NFC).
 - 6. National Fire Protection Association (NFPA).
 - 7. Local Building Department.
 - 8. Local Fire Marshal.
 - 9. Office of the State Fire Marshall.
 - 10. Division of the State Architect.
 - 11. Office of the Statewide Health Planning and Development.
 - 12. California Energy Commission.
 - 13. In the event of conflict between or among specified requirements and pertinent regulations, the more stringent requirements will govern when so directed by the Architect.
- C. Scope of Work: (Plumbing Section Division 15)
 - 1. Material and labor including rough-in for and connection to fixtures, appliances and equipment are:
 - a. WASTE AND VENT
 - 1. Soil piping
 - 2. Drain waste and vent piping (DWV)
 - 3. Indirect waste piping
 - 4. Trench drains.
 - 5. Area drains.
 - 6. Floor drains.
 - 7. Traps.
 - 8. Vent flashings.
 - b. SEWERS (To five feet beyond building)
 - 1. Including metallic or non-metallic piping used to convey sewage and other waste to, and including, connection with offsite utility or onsite treatment and disposal system.
 - c. STORM AND SUB-SOIL DRAINAGE

1. Roof and overflow drains, including flashing, rain water drainage piping. Exterior rainwater leader downspouts (10 gauge and heavier).
2. Storm water sewers inside property lines.
- d. WATER
 1. Potable water piping systems including above and below grade tanks, pressure reducing valves, relief valves, balancing valves, water hammer shock absorbers, air chambers.
 2. Isolation, Zone and Control Valves.
 3. Hot water systems including heaters and storage tanks.
 4. Hot water circulating pumps.
 5. Piping for water service.
 6. Backflow preventers.
 7. Disinfecting of water systems.
 8. Insulation of piping and equipment for heat, sound, and vibration.
- e. ALL PLUMBING FIXTURES AND SUPPORTS
 1. Including, but not limited to:
 - (a) Sinks, lavatories, water closets, urinals, tubs, service sinks, etc., - all materials
 - (b) Shower pans, shower receptors, and shower stalls
 - (c) Supports (backing) for all plumbing fixtures and accessories
 - (d) Installation of sinks in or part of drain boards - all materials
- f. FUEL OIL PIPING
 1. All piping, valves and appurtenances for complete systems as shown on the drawings and as specified herein.
 - 2.
- g. PIPE IDENTIFICATION – Refer to Section 23 00 13
- h. CONNECTIONS
 1. Utilities-Sanitary sewer, storm drain, water, gas
 2. Hot water tanks
 3. Temporary water, waste and air lines
 4. The joining of pipe by any mode or method including, but not limited to, acetylene and arc welding, brazing, lead burning, plastics welding, soldering, wiped joints, caulked joints expanded or rolled joints, etc., used in connection with any of the work listed herein.
- i. LAYOUT AND CUTTING
 1. Holes, chases, channels, the setting and erection of bolts, inserts, stands, brackets, stanchions, supports, sleeves, escutcheon plates, thimbles, hangers, conduits, and boxes.
- j. EXCAVATION, TRENCHING AND BACKFILL
 1. In connection with plumbing and piping work shown herein
- k. TEMPORARY PIPING in connection with:
 1. Building and construction work
 2. Excavating and underground construction
 3. Demolition work

1. PIPE HANGERS, SUPPORTS, ANCHORS, GUIDES, EXPANSION JOINTS
 1. Including:
 - (a) Supports for equipment to which pipe is connected, such as tank supports
 - (b) Isolators-dielectric and vibration
 - (c) Anchors and thrust blocks of concrete, metal, etc.
 - (d) Seismic bracing
 - (1) Anvil/Badger, Mason Industries, B-Line/TOLCO or approved equal.
 - (2) Seismic hanger system design shall comply with CBC 2013 requirements and ASCE 7-05 and 7-10.
 - m. SIGNS AND NOTICES
 - n. ROOF FLASHINGS FOR PIPING PENETRATIONS
 - o. TESTS
 1. Piping, for tightness
 2. Equipment for performance
 3. Operating instructions
 4. Final operation

1.02 Accessible Plumbing Fixtures

- A. Accessible plumbing fixtures shall comply with all of the requirements of CBC Section 11B-213, 11B-305, & 11B-308.

1.03 Quality Assurance

- A. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section.
- B. Without additional cost to the Owner, provide such other labor and materials as are required to complete the Work of this Section in accordance with the requirements of governmental agencies having jurisdiction, regardless of whether such materials and associated labor are called for elsewhere in these Contract Documents.
- C. Welder's Qualifications: Comply with ASME B31.8. The pipe welder shall have a copy of a certified ASME B31.8 qualification test report. Contractor shall also conduct a qualification test. Submit each welder's identification symbols, assigned number, or letter, used to identify work of the welder. Affix symbols immediately upon completion of welds. Welders making defective welds after passing a qualification test shall be given a requalification test and, upon failing to pass this test, shall not be permitted to work this contract.

1.04 Submittals

- A. Comply with pertinent provisions of Architectural Sections.

- B. Product Data: Within 35 calendar days after the Contractor has received the Notice to Proceed, submit 6 copies of the following to the Architect for approval prior to acquisition:
 - 1. Materials list of items proposed to be provided under this Section.
 - 2. Manufacturer's specifications, catalog cuts, and other data needed to prove compliance with the specified requirements. All pieces of equipment shall be clearly identified on corresponding manufacturer's literature being submitted.
 - 3. Shop Drawings or other data as required to indicate method of installing and attaching equipment, except where such details are fully shown on the Drawings.
 - 4. All submittals for the entire project shall be submitted at the same time. Submittals shall be provided in a tabulated three ring binder or in PDF format. Incomplete or noncompliant submittals may be rejected.

1.05 Design Changes Caused By Product Substitutions

- A. Contractor shall pay costs of design and installation for changes resulting from substitution of alternate products.
- B. Acceptance of alternate products by Architect does not change this requirement.

1.06 Product Handling

- A. Comply with pertinent provisions of Architectural Sections.

PART 2 PRODUCTS

2.01 Waste, Vent, Sewer And Storm Drainage

- A. Above Grade
 - 1. All waste, vent, sewer and storm lines shall be of cast iron soil pipe and fittings and shall conform to the requirements of CISPI Standard 301, ASTM A-888 or ASTM A-74 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.
 - a. Acceptable Manufacturers:
 - 1. AB&I Foundry
 - 2. Charlotte Pipe and Foundry
 - 3. Tyler Pipe Company
 - b. Joints
 - 1. Standard joints: for hubless pipe and fittings shall conform to the manufacturer's installation instructions and local code requirements. Hubless coupling gaskets shall conform to ASTM Standard C-564 and be listed with NSF International.
 - c. Mandatory Referenced Standards
 - 1. Cast Iron Soil Pipe Institute Standard Specifications - Latest Issue
 - (a) CISPI 301: Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.

- (b) CISPI 310: Couplings for use in connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.
 - 2. ASTM Standard Specifications - Latest Issue
 - (a) A-888: Standard Specifications for Hubless Cast Iron Soil Pipe and Fittings.
 - (b) C-564: Standard Specifications for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
- B. Below Grade:
 - 1. Schedule 40 Solid wall PVC plastic DWV pipe with solvent-cemented drainage pattern fittings complying with ASTM D 1785 - Latest Issue.
 - a. SCH. 40 Cellular Core PVC plastic DWV pipe with solvent-cemented drainage pattern fittings complying with ASTM D 4396 may be used at Contractor's option for vent piping. -Latest Issue.
 - 2. Schedule 40 Solid wall ABS plastic DWV pipe with solvent-cemented fittings complying with ASTM D-2661 - Latest Issue.
 - a. SCH. 40 Cellular Core ABS plastic DWV pipe with solvent-cemented drainage pattern fittings complying with ASTM D 3965 may be used at Contractor's option for vent piping. -Latest Issue.
- C. Condensate (sized per CMC) and indirect waste drains
 - 1. Type L Copper Water Tube ASTM B88 with wrought Copper solder fittings, ANSI-B16.22

2.02 Domestic Water Piping

- A. Below Grade Water Service outside building
 - 1. 3" NPS and smaller, Schedule 40 PVC Plastic Pipe and fittings. ASTM D1785, D2466, with Solvent Cement Joints ASTM D2564.
 - 2. 2" NPS and smaller, Type K Soft Annealed Temper Copper Tube ASTM B88 with Wrought Copper pressure fittings, ANSI B16.22. SIL-FOS - High temperature Brazing Metal Filler.
 - 3. 4" NPS and larger, PVC AWWA C900 Class 100 Plastic Pipe with Ductile-Iron fittings AWWA C110, C111 or Elastomeric Gasket Joints
- B. Above Grade (Distribution System inside building)
 - 1. Piping
 - a. For soldered, brazed, and mechanical joints, 4" and smaller Copper Water Tube Type L Annealed Temper (Hard Drawn) ASTM B75 or ASTM B88.
 - 2. Fittings
 - a. Wrought Copper Pressure Solder Fittings, ASME B16.22 or ASME B16-25, 95-5 Tin-Antimony Filler Metal.
 - b. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
 - c. Copper Unions: MSS SP-123, cast-copper alloy, hexagonal-stock body, with ball-and-socket, met-to-metal seating surfaces, and solder-joint or threaded ends.

- d. All underground water piping within the building boundaries shall be ASTM B88-93a Type "L" annealed (soft) copper tube made up without fittings below the floor level.

2.03 Fuel Oil Piping

- A. Below Ground
1. Schedule 40, Seamless, Black Steel Pipe, 2 1/2" and under ASTM A-120 with Malleable-Iron Threaded fittings ANSI-B16.3, Class 150. Pipe and fittings shall be coated and wrapped per IAPMO IS 13-91 or provide factory applied plastic coated pipe.
 2. Schedule 40, Seamless Steel Pipe 3" and larger ASTM A-53 with Buttweld Steel fittings ASTM-A-234
- B. Above Ground
1. Schedule 40, Seamless Black Steel Pipe ASTM A 120 2 1/2" and smaller with Malleable Iron Threaded fittings ANSI B16.3 Class 150
 2. Schedule 40, Seamless Steel Pipe 3" and larger. ASTM A53 with Buttweld Steel fittings ASTM A 234

2.04 Valves

- A. Acceptable Manufacturers: Milwaukee, Hammond, Jomar, NIBCO, Watts, others as noted.

Type	Size Range	Part Number
Ball	2" and smaller (2 piece)	Milwaukee UPBA400 Hammond UP8301A NIBCO 585-80-LF
Ball	2-1/2" and larger (3 piece)	Milwaukee UPBA300 Hammond UP8604 NIBCO 595Y-LF
Note: Stem extensions of non-thermal-conductive material and protective sleeve that meets UL 2043 approved for inside air plenum and allows operation of value without breaking the vapor seal shall be used on all insulated pipe. NIBCO NIB-Seal handle or acceptable equal.		
Gate	2" and smaller	Milwaukee UP115 Hammond UP645 NIBCO T-113-LF
Gate	2½" and larger	NIBCO F-619-RW
Gate-Underground	3" and larger	Mueller A-2362 NIBCO F-619-RW
Check-Swing	2" and smaller	Milwaukee UP509 Hammond UP943 NIBCO 413Y-LF
Check-Spring	2" and smaller	Milwaukee UP548T NIBCO 480Y-LF
Check-Swing	2½" and larger	Apollo 61YLF NIBCO F-910-B-LF

Type	Size Range	Part Number
Check-Spring	2½" and larger	NIBCO F-938-33
Gas Cock (ball)	2" and smaller	Milwaukee BA475B Hammond 8901 NIBCO FP600
Gas Cock (plug)	1/2" to 4"	Homestead 611/612 Walworth 1796/1797 (with wrench)

- B. All compressed air valves shall be ball valves especially made for compressed air service.
- C. All pump discharges shall have a check valve placed minimum 5 pipe diameter from the pump.
1. NIBCO W920W or F910B
 2. Acceptable equal.
- D. All below grade ball valves shall have stainless steel handles.

2.05 Hangers And Supports

- A. In general, all pipe hangers and supports shall conform to the following except where special pipe hangers and supports are detailed on the Drawings. In all cases hanger and support details on the Drawings shall take precedent over the following:

Piping 6" Size and Smaller:		
Items	TOLCO	Anvil
Pipe Hanger	1; 2; 200	260
Side Beam Clamp for Wood Joist	58	207
Beam Coupling for Steel Beams	65	92
Rod Coupling for Connection to "Hilti"	70	135
Inserts in Concrete Decks	107; 109A; 109AF	N/A
Trapeze Hangers	Tolstrut A12	AS200
Pipe Clamp	TOLCO cush clamp	AS002OD-AS098D

- B. Similar items by Anvil International, Erico-Caddy, or TOLCO/B-Line will be acceptable.
- C. Hanger Rods shall conform to the following table:

Tube/Pipe Size	Rod Diameter
½" to 4"	3/8"
5" to 8"	½"
10" to 12"	5/8"

- D. Trapeze hangers may be used where parallel runs of pipe occur. All rods on trapeze hangers shall be 1/2" minimum size.

- E. Hanger Support Spacing shall be as follows unless shown otherwise on the Drawings:
 - 1. Horizontal:
 - a. Cast Iron: Every other joint unless over 4 feet, then at every joint.
 - b. Copper: Every 6 feet for 1-1/2 inch and smaller, and 10 feet for 2 inch and larger.
 - c. Steel, Gas: Every 6 feet for 1/2 inch, 8 feet for 3/4 inch and 1 inch, and 10 feet for 1-1/4 inch and larger.
 - d. Schedule 40 PVC or ABS DWV: Every 4 feet for all sizes. Provide for expansions every 30 feet.
 - 2. Vertical:
 - a. Cast Iron: Base and every floor not to exceed 15 feet.
 - b. Copper: Every floor not to exceed 10 feet.
 - c. Steel, Gas: Same as horizontal spacing except 1-1/4" and larger at every floor.
 - d. Schedule 40 PVC or ABS DWV: Base and every floor with mid-floor guides. Provide for expansion every 30 feet.
- F. Refer to the plumbing code for materials not listed above.
- G. At all points where insulated pipe contacts a hanger or support, the point of contact shall be protected by metal insulation pipe shield #B3153 as manufactured by B-Line. Equivalent pipe protectors will be considered provided the substitute item meets the same standard of quality and performance as the specified item.
- H. Seismic restraint devices
 - 1. Available Manufactureres:
 - 2. Anvil/Badger
 - 3. Mason Industries
 - 4. B-Line Tolco Division of Eaton
 - 5. Seismic hanger system design shall meet the requirements of IBC, CBC and ASCE 7-05 and 7-10.

2.06 Wall And Floor Penetrations

- A. Fire walls and floors:
 - 1. Wall and floor penetrations shall be protected with a U.L. approved fire rated system. The system shall be per the Drawing Details, or other manufacturer's installation instructions.
 - 2. Fire stopping materials by Hilti, Metacaulk, or 3M are considered equal. The material shall be the same as called out for in the U.L. approved system.
- B. Poured concrete walls and floors:
 - 1. Pipes penetrating poured concrete walls and floors shall be protected by providing the following:
 - a. A Schedule 40 PVC sleeve one (1) size larger than the pipe or one quarter (1/4) inch of foam material wrapped around and secured to the pipe or packed and caulked with mineral wool.
 - b. Protection shall end flush with the wall or floor surface.
- C. All walls and floors:

1. Piping passing through walls and floors exposed to view shall be provided with chrome plated split-ring escutcheon plates in finished areas. Brass or galvanized escutcheon plates may be used elsewhere.

2.07 Flashing

- A. All flashing shall be 4 lb. sheet lead and all vents penetrating the roof shall be flashed and counter-flashed. Stoneman Co. roof flashing assembly with 10" skirt or equal may be used.
- B. The flashing for vents penetrating a metal roof shall have a corrosion resistant aluminum base compatible with the roofing system. A rubber type flashing by "Tech Specialties" shall be installed between the flashing and pipe.
- C. For single ply roofing, provide flashing per roofing manufacturer recommendations or installation instructions.

2.08 Valve Boxes

- A. Brooks Products Inc., Christy Co., or equal with the word "Water" or "Gas" cast in cover as applicable.

2.09 Cleanouts

- A. Provide cleanouts per Drawings and details on Drawings. Cleanouts as manufactured by J. R. Smith, Mifab, Wade, or Zurn are approved equals.
- B. Cleanout tops to be installed with tamper-proof screws.

2.10 Floor Drains, Floor Sinks And Roof Drains

- A. Provide drains as specified on the Plumbing Schedule. Drains as manufactured by J.R. Smith, Mifab, Wade, and Zurn will be acceptable provided they are equal.
- B. Floor sinks by J.R. Smith, Mifab, Wade, Zurn, or Commercial Enameling are acceptable provided they are equal.

2.11 Water Hammer Arrestors

- A. Provide Wilkins Piston Model #1250XL, Sioux Chief #65X-X, Precision Plumbing Products, or equal, as sized on the Drawings or required by PDI. Install per manufacturer's instructions.

2.12 Automatic Trap Primers

- A. Provide Precision Plumbing Products, J.R. Smith, Mifab, or Zurn as specified on the Drawings. Install per manufacturer's instructions.

2.13 Plumbing Fixtures

- A. Fixture locations, quantities, types, sizes and connections shall be as shown on both the Plumbing and Architectural Drawings. If a conflict in fixture location is noted between the Plumbing and Architectural Drawings, the Architectural Drawings shall take precedence.
- B. Fixtures shall be thoroughly protected against damage to the chrome plate or enamel, by chipping, scratching or other damage during the entire period of construction. Roof drains, floor sinks and drains, toilet and sink drains, plumbing vents, and all other similar fixtures shall be covered to prevent trash from entering the pipes until final installation of grates, domes, fixtures or other protective devices.
- C. Provide fixtures as specified in the Plumbing Schedule. American Standard, Crane, Elkay, Kohler, or Zurn are acceptable substitutes provided they are equal if approved by Engineer.
- D. Fixture carrier numbers listed are as specified on the Plumbing Schedule; however, carriers as manufactured by J.R. Smith, Mifab, Wade, or Zurn are acceptable provided they are equal.

2.14 Connectors

- A. Provide Brass Craft "Speedway" or equal heavy pattern iron pipe size brass stops, rigid or flexible supplies and chrome plated brass "P" traps. Stops in "Public" areas are to have screwdriver slots and those in "Private" areas are to have all cross handles.
- B. Provide Brass Craft or equal flexible stainless steel braided water supplies to appliances. They may also be used to fixtures as an option to rigid supplies. Aquaflo is an acceptable substitute.
- C. Provide Brass Craft flexible or equal, stainless steel gas appliance connectors. Dormont is an acceptable substitute. Diameter of connector to be as recommended by manufacturer based on connector length and rated capacity of equipment.

2.15 Access Boxes

- A. See section 23 00 13 for access panels.

2.16 Pressure Gages And Thermometers

- A. Provide Marsh Quality gages or equal with 3-1/2" dial, gage cock, in type required. For pump suction, provide compound type.
- B. Provide Terrice 7" BX or 3" Bimetal Dial series thermometers or equal, straight, angle, or oblique as required, equipped with separable sockets and well. Provide extension necks as required on insulated line.
- C. Arrange gages and thermometers for easy reading.

2.17 Pressure Regulators And Backflow Preventors

- A. Provide the pressure regulator(s) and backflow preventer(s) as specified on the drawings and/or as required by the governmental authority having jurisdiction.
- B. Pressure regulators and/or backflow preventers by Febco, Hersey, Watts or Wilkins are considered equal when their pressure fall-off/loss is equal to or less than the specified regulators/preventer's loss for the given flow rate.
- C. Provide all potable water outlets with hose attachments with non-removable hose bibb backflow preventers per the C.P.C.

2.18 Water Heaters

- A. Provide water heaters as specified in Plumbing Schedule or approved equal of size, capacity, recovery, and KW/BTUH input. American, A.O. Smith and State are considered equal. Heater shall be A.G.A. or U.L. listed.
 - 1. Heater storage tank shall be provided with magnesium anodes, approved standard pressure/temperature relief valve and all standard factory trim.
 - 2. Provide approved flexible copper supplies for the water heater water connections.
 - 3. Instantaneous tankless water heaters shall be with water flow activated switch to energize the electrical/gas power source, a safety high water temperature limit, and all standard factory trim.
- B. Provide a Smitty Co., Benjamin Co. with 1" drain outlet or equal, water heater pan as specified in the Water Heater Schedule.

2.19 Pressure-Temperature Relief Valve

- A. Pressure-temperature relief valve shall be Wilkins TP220 or TP3000 Series or equal.

2.20 Expansion Tank

- A. Expansion tank shall be as specified on the Drawings or approved equal in size and capacity. Amtrol, Watts, and Zurn expansion tanks are considered equal.

2.21 Water Heater Seismic Restraints

- A. Seismic restraints shall be Spacemaker restraint system Model E-50 or E-100 as applicable for the water heater specified. Spacemaker Model #TSE-25 or Seismik Model #SR-2 may be substituted when first approved by the Engineer.

2.22 Protective Insulation (Ada Fixtures)

- A. Provide approved manufactured, molded antimicrobial vinyl protective pipe and fitting covering for exposed waste and drain assembly and for hot and cold water supplies and stops. Protective system shall consist of pre-formed pipe or tubing sleeve and pre-formed fitting patterns for trap and stops. Assembly shall have integral snap fasteners.
- B. Provide protective covering for off-set drain assembly and disposer at kitchen sinks.
- C. Foam pipe wrap, duct tape, baggy-type covers, tie-strap fasteners are not acceptable.

- D. Acceptable manufacturers:
1. Truebro "Lav-Guard"
 2. Plumberex "Pro-Xtreme"
 3. Zurn #Z89XX-XX

2.23 Insulation

- A. All pipe insulation shall conform to Section 123 of the California Energy Efficiency Standards except to the extent that this Specification supersedes the minimum standards as established by the Code, in which case this Specification shall take precedent. Outside insulation shall be protected with a hard plastic or metal shell covering.
- B. Insulation material shall meet requirements of flame spread not to exceed 25 and smoke developed not to exceed 50 as tested by Procedure ASTM-E-84, NFPA 255 or U.L.723.
- C. Domestic cold water piping shall be insulated with a minimum 1" insulation in unheated areas of the building and where exposed outside of the building.
- D. Domestic hot water piping shall be insulated with Owens-Corning Fiberglass heavy density pipe insulation 25 ASJ/SSL-II (All Service Jacket/Double/ Self-Sealing Lap). Insulation shall be UL rated non-combustible pipe insulation with a k factor of 0.24-0.28 @ 100 degrees F. mean temperature, an embossed vapor barrier laminated and pressure sealing lap adhesive. All lap and butt strips shall have integral pressure-sensitive strips and shall be applied in strict accordance with manufacturer's instructions.
1. Closed cell polyethylene foam by IMCOA or equal may be used at Contractor's option provided it meets the above requirements.
- E. Insulation thickness' shown below are based on insulation having a conductivity range of 0.24 to 0.28 per BTU/inch per hour per square foot per °F temperature of 100 degrees F.

Temperature Range: Above 105°F	
Pipe Size	Minimum Insulation Thickness
Run outs* up to 2"	0.5"
1" and less	1.0"
1.25" – 2"	1.0"
2.5" – 4"	1.5"
5" and larger	1.5"
*Run outs are defined as being less than 2-inches in diameter, less than 12 feet long, and connected to fixtures or individual terminal units.	

- F. Insulation materials not meeting the specified conductivity range shall be submitted for approval and determination of the insulation thickness required.
- G. Water, soil and waste pipes installed in the exterior walls, attics, crawl spaces or outside the building shall be protected from freezing.

2.24 Circulation Pump: (Domestic)

- A. Provide pump(s) per schedule. Bell and Gossett, Grundfos, Laing or March are considered equal.

PART 3 EXECUTION

3.01 General Conditions

- A. Examine the areas and conditions under which Work of this Section will be performed. Conditions detrimental to timely and proper completion of the Work shall be brought to the attention of the Architect before the installation of materials. Do not proceed until unsatisfactory conditions are corrected. Incorrectly installed materials requiring changes will be at Contractor's expense.
- B. All plumbing fixtures, appliances, and appurtenances furnished with manufacturer's installation instructions shall be installed per those instructions.

3.02 Plumbing System Layout

- A. Lay out the plumbing system in careful coordination with the Drawings. Determine proper elevations for all components of the system and use only the minimum number of bends to produce a satisfactorily functioning system.
- B. Follow the general layout shown on the Drawings in all cases except where other Work may interfere.
- C. Lay out pipes to fall within partitions, walls, or roof cavities, and to not require furring other than as shown on the Drawings.

3.03 Piping Installation

- A. Pipe sizes as shown on drawings are Nominal Pipe Size (NPS) or Iron Pipe Size (IPS). Drawings and fixture schedule indicate pipe sizing per the CPC and Standard Engineering Practice. Pipe sizes shall be maintained to fixtures, appliances and equipment. Approved reducing fittings shall be installed at all points of connections.
- B. Install piping generally square with building, free of traps or air pockets, and true to line and grade. Keep all piping tight to the building structure, unless pipe slope is required. Do not install piping in any locations where, in the Architect's opinion, it will interfere with the use of the building or create a safety hazard. Where space is inadequate, notify the Architect in time to avoid unnecessary Work. Install all exposed piping as high as possible without interfering with other trades.
- C. Make changes in direction with manufactured fittings; use long radius elbows. Street elbows, bushings, close nipples and bending of pipe or tubing will not be allowed.
- D. Provide "P" traps at sanitary sewer drainage devices without integral traps.
- E. Gas piping shall be tapped off the top or side of pipe and ends of mains shall be provided with dirt legs.

- F. Underground plastic pipe will horizontally transition to metal pipe 5 feet before the above ground riser. Install plastic pipe with a minimum of 36" of cover when located under areas of possible vehicle traffic. Approved metallic pipe must be used if the minimum depth is not met. A tracer wire, terminating at each end at an exposed location, will be installed with all underground plastic pipe. Gas piping will also have a continuous tape marked "Gas" laid 6" above it.
 - 1. Piping may terminate a maximum of one foot above ground when encased in a listed metallic transition riser.
- G. Use friction wrenches when installing brass, polished, or soft metal piping, and when installing piping exposed in finished areas. Replace piping showing wrench marks.
- H. Attach escutcheon plates to pipes with set screws or spring clamps with concealed hinges. Continue insulation through escutcheon plates.
- I. General:
 - 1. Proceed as rapidly as the building construction will permit.
 - 2. Thoroughly clean items before installation. Cap pipe openings to exclude dirt until fixtures are installed and final connections have been made.
 - 3. Cut pipe accurately, and work into place without springing or forcing, properly clearing windows, doors, and other openings. Excessive cutting or other weakening of the building will not be permitted.
 - 4. Show no tool marks or threads on exposed plated, polished, or enameled connections from fixtures. Tape all finished surfaces to prevent damage during construction.
 - 5. Provide sufficient swing joints, ball joints, expansion loops, and devices necessary for a flexible piping system, whether or not shown on the Drawings.
 - 6. Support piping independently at pumps, coils, tanks, and similar locations, so that weight of pipe will not be supported by the equipment. Support the equipment independently from the pipe.
 - 7. Pipe the drains from mechanical equipment, drip pans, relief valves, air vents and similar locations, to an open sight drain, floor drain, or other acceptable discharge point, and terminate with an air break or air gap per C.P.C.
 - 8. Securely bolt all equipment, isolators, hangers, and similar items in place.

3.04 Pipe Support Installation

- A. Support pipes from structure with assemblies specified. Provide auxiliary members, anchors, guides, and sway braces necessary to maintain pipe alignment and prevent excessive movement or strain on piping system or components; allow for expansion and contraction of piping. Provide at least one hanger for each branch. Do not use powder driven fasteners, wire, perforated tape, nails, wood blocking, or other makeshift devices to support pipe.
- B. Attach supports to structure with bolts, screws or concrete anchors, per support manufacturer's requirements.

3.05 Joints And Connections

- A. Cut pipe shall be reamed to full inside diameter of pipe. Cut threads straight and true. Insure all filings have been removed from inside of the pipe. Apply liquid Teflon to male pipe threads and not inside fittings. Use graphite on cleanout plug threads.
- B. Joints in cast iron "No-Hub" soil/waste pipe and fittings shall be made up with neoprene gaskets and stainless steel bands conforming to CISPI 310, torque to the manufacturer's specification with an approved torque wrench. Joints in hub and spigot shall be made up with compression gaskets conforming to ASTM C-564.
- C. Joints in copper tube shall be made with 95-5 tin-antimony or lead-free solder, applied in strict accordance with the manufacturer's directions.
- D. Dissimilar metals shall be isolated with dielectric couplings, "EPCO" or approved equal. Provide access panels at all hidden couplings.
- E. All plastic pipe shall be joined in accordance with the manufacturer's recommendations for their pipe and IAPMO Installation Standard per the latest edition of the C.P.C.
- F. Pipe Protection: Provide protection against abrasion where copper tubing is in contact with other building members by wrapping with an approved tape, pipe insulation or otherwise suitable method of isolation.
- G. Penetration Protection: Provide allowance for thermal expansion and contraction of copper tubing passing through a wall, floor, ceiling or partition by wrapping with an approved tape or pipe insulation, or by installing through an appropriately sized sleeve. Penetrations of fire resistance rated assemblies shall maintain the rating of the assembly

3.06 Sanitary Sewer, Vent And Indirect Waste System Installation

- A. Install horizontal drainage piping at a minimum 2%, condensate 1%, slope unless otherwise noted. Where this is impractical notify the Architect before installing the pipes.
- B. Install vent piping to drain back into the sewer system.
- C. Provide cleanouts where shown on Drawings and where required by governmental agencies having jurisdiction.
 - 1. All cleanouts to grade shall be firmly secured by means of a concrete block 20" square by 5" thick, and shall be flush with finished grade, unless otherwise noted on the plans.
- D. Provide automatic trap primers as specified at floor sinks and drains as indicated on Drawings or where required by governmental agencies having jurisdiction. Provide access panels for all hidden mechanical trap primers.

3.07 Valve Installation

- A. Provide valves in the water, air, and gas systems. Locate and arrange so as to give a complete regulation of apparatus, equipment, and fixtures.

- B. Provide valves in at least the following locations:
 - 1. In branches and/or headers of water piping serving a group of fixtures.
 - 2. On both sides of apparatus and equipment.
 - 3. For shutoff of risers and branch mains.
 - 4. For flushing and sterilizing the system.
 - 5. Where shown on the Drawings.
- C. Locate valves for easy accessibility and maintenance. Provide access panels for all hidden valves.
- D. Unions shall be installed downstream of all screwed valves.

3.08 Water Hammer Arrestor Installation

- A. Provide water hammer arrestor on hot and cold water lines.
 - 1. Install at all quick closing valves, solenoids, and supply headers at plumbing fixture groups.
 - 2. Locate and size as shown on Drawings, and where not shown, locate in accordance with Plumbing and Drainage Institute Standard WH-201.
 - 3. Install water hammer arrestor behind access panels.

3.09 Backflow Prevention Installation

- A. Protect plumbing fixtures, faucets, hose connections, and other equipment having plumbing connection, against possible back-siphonage.
- B. Arrange for testing of backflow devices as required by the governmental agencies having jurisdiction.

3.10 Plumbing Fixture Installation

- A. Connect plumbing services to fixtures as shown on Drawings and as specified.
- B. Provide & install compression stops and flexible supplies per fixture manufacturer's recommendation or as high as possible on wall directly below fixtures.
- C. Install fixtures at right angles to, and tightly against, building surfaces, and in proper alignment. Fill gaps between fixtures and building surfaces with white grout. Mounting heights and locations shall be as shown on the Drawings, or, if not shown, as directed by the Architect.

3.11 Insulation Installation

- A. Ensure surfaces are clean and dry surfaces to application of insulation or adhesives.
- B. Insulate piping, fittings, valves, and strainers. Leave unions exposed. Where insulation terminates, bevel ends of insulation and continue jacket over insulation and secure to pipe. Do not interrupt insulation at hangers, supports, clamps, or penetrations through structure. Fittings shall be finished with "Zeston" or approved equal fitting closures. If fitting closures not available, use 8 oz. canvas dipped in "Seal-Fas".

- C. Attach longitudinal jacket laps and butt strips with factory applied pressure sensitive adhesive. On concealed piping only, outward clinching coated staples at two inch spacing may be used. Cover elbows with one piece polyvinyl chloride covers. Secure with tack fasteners. Tape ends of covers with matching tape on exposed piping. Seal off all cut ends with canvas and Benjamin Foster 30-36.
- D. Install closed cell polyethylene foam per manufacturer's instructions.

3.12 Testing And Adjusting

- A. Provide personnel and equipment, and arrange for and pay the costs of, all required tests and inspections required by governmental agencies having jurisdiction. See Section 23 00 13 for test requirements.
- B. Where tests show materials or workmanship to be deficient, replace or repair as necessary, and repeat the tests until the specified standards are achieved.
- C. Adjust the system to optimum standards of operation.

3.13 CLEANING (For Potable Water Systems)

- A. Disinfection: The hot and cold water distribution system shall be disinfected prior to being placed in service. The system shall be disinfected within 3 weeks of occupancy in accordance with AWWA C651 or the following requirements:
 - 1. The piping system shall be flushed with potable water until discolored water does not appear at any of the outlets.
 - 2. The system shall be filled with a water chlorine solution containing at least 50 parts per million of chlorine. The system shall be valved off and allowed to stand for 24 hours. Or, the system shall be filled with a water chlorine solution containing at least 200 parts per million of chlorine. The system shall be valved off and allowed to stand for 3 hours.
 - 3. Following the standing time, the system shall be flushed with water until the chlorine is purged from the system.
 - 4. Provide bacteriological sampling and analysis results to the Engineer for review.

3.14 Warranty

- A. The contractor shall warranty all of the systems for proper operation installed by the contractor for not less than one calendar year from date of project completion. This completion date shall be set by the Architect or owner.

END OF SECTION

Section 23 00 00
Heating, Ventilation, And Air Conditioning

PART 1 GENERAL

1.01 Description:

- A. Related Documents:
 - 1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
 - 2. Where requirements of the Section exceed those in other Contract Documents, Contractor shall comply with the requirements of this Section.
- B. Codes and Regulations:
 - 1. In addition to complying with the specified requirements, comply with pertinent regulations of the Authority Having Jurisdiction. All work must comply with the version of the code that was in affect at the time of the initial permit submittal.
 - a. California Building Code
 - b. California Electrical Code
 - c. California Mechanical Code
 - d. California Plumbing Code
 - e. California Energy Code
 - f. California Fire Code
 - g. California Green Building Standards Code (CAL Green)
 - h. Reach Codes that have been adopted by the Authority Having Jurisdiction.
 - i. National Fire Protection Association
 - j. Local Building Department
 - k. Local Fire Marshall
 - 2. In the event of conflict between or among specified requirements and pertinent regulations, the more stringent requirements will govern when so directed by the Architect.
- C. Included: Work includes, but is not necessarily limited to, the following.
 - 1. The Work covered by this Specification shall include furnishing labor, material, equipment, and services to construct, install and place in operation, the complete Heating, Ventilating and Air Conditioning Systems to the extent as indicated, and as shown on the Drawings and specified herein. The Work covered under this Section shall hereinafter be referred to as the Mechanical System.
 - 2. A system of temperature controls shall be furnished and installed complete as hereinafter described. Low voltage wiring and conduit, complete with electrical accessories and materials as required for the installation of the temperature control system shall be furnished and installed under this Section of the Contract but shall conform to the Specification requirements as set forth under Division 26.
 - 3. Roof Top Gas Heat/Electric Cooling AC Units
 - 4. Roof Top Packaged Heat Pump Units
 - 5. Energy Recovery Ventilators

6. Chillers
 7. Fan Coil Units
 8. Cooling Coils
 9. Condensing Units
 10. Heat Pump Units
 11. Centrifugal Exhaust Fans and Roof Exhausters
 12. Duct systems complete with supports, dampers, grilles, registers, diffusers and louvers.
 - a. Supply Air
 - b. Return Air
 - c. Exhaust Air
 - d. Outside Air
 - e. Combustion Air
 - f. Product Conveying Systems
 13. Filters and Filter Boxes
 14. Duct, Pipe and Equipment Insulation
 15. Low Voltage Controls
 16. Refrigerant Piping
 17. Fire Life Safety Devices
 - a. Combination Fire/Smoke Dampers
 - b. Duct Smoke Detectors
 - c. Fire Stop Systems.
 18. Vibration Isolators
- D. Work Not Included In This Section:
1. Blocking, framing and wood supports required for the purpose of accommodating the Mechanical System unless specifically called for under this Division. The contractor is responsible for the correct location of such items and shall bear the expenses covering their omission or improper location.
 2. Electrical connections to motors, electric starters, disconnect and over-current protective devices, unless specifically called for by this Section, or unless the equipment is furnished as an integral part of the Mechanical System Equipment, as hereinafter specified, or noted on the Drawings.
 3. Line voltage electrical wiring and conduit, except where specifically called for on the Drawings or hereinafter in this Section.
 4. Painting, except when supplied as factory finish, or specifically called for in this Section or on Drawings.

1.02 Quality Assurance

- A. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section.
- B. Without additional cost to the Owner, provide such other labor and materials as are required to complete the Work of this Section in accordance with the requirements of governmental agencies having jurisdiction, regardless of whether such materials and associated labor are called for elsewhere in these Contract Documents.

1.03 Submittals

- A. If the heating and/or air conditioning equipment is substituted with a different brand or model than that specified on the Drawings the Authority Having Jurisdiction may require the energy compliance calculations to be updated. The contractor shall be responsible for all cost related to updating the calculations. If the substituted equipment does not comply the contractor shall be responsible for providing equipment that meets or exceeds the performance of the specified equipment at no additional cost to the Owner.
- B. Comply with pertinent provisions of Architectural Section.
- C. Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit 6 copies of the following to the Architect for approval prior to acquisition:
 - 1. Materials list of items proposed to be provided under this Section including, but not limited to heating, ventilating and air conditioning equipment and mountings, air distribution equipment, ductwork and fittings, flexible ductwork, flue vent pipe, duct specialties, flexible connections, insulation, lining and adhesive, duct joint sealer, temperature controls, piping and accessories.
 - 2. Manufacturer's specifications, cut sheets, and other data needed to prove compliance with the specified requirements. All pieces of equipment shall be clearly identified on corresponding manufacturer's literature being submitted. All information for each item shall be correlated.
 - 3. Shop Drawings or other data as required to indicate method of installing and attaching equipment, ductwork and piping except where such details are fully shown on the Drawings.
 - 4. Submittals for entire Project shall be submitted at the same time or may be rejected until all are included in one submittal package.
 - 5. Submittals shall be provided in pdf format.

1.04 Design Changes Caused By Product Substitutions

- A. Contractor shall pay costs of design and installation for changes resulting from substitution of alternate products.
- B. Acceptance of alternate products by Architect does not change this requirement.

1.05 Product Handling

- A. Comply with pertinent provisions of Architectural Sections.

PART 2 PRODUCTS

2.01 Heating, Ventilating And Air Conditioning Equipment

- A. Heating, Ventilating, and Air Conditioning Equipment: Equipment shall be as specified on the Drawings. All other equipment shall be pre-approved by the Mechanical Engineer.
- B. It shall be the responsibility of the Contractor to see that any substituted equipment performs similarly to that which is specified and fits in the same area as specified. Cost of

any additional Work caused by the substitution of equipment shall be borne by the Contractor.

2.02 Air Distribution Equipment

- A. Grilles, registers and ceiling diffusers and other accessory equipment shown on the Drawings and "Grille, Register and Diffuser Schedule" shall be manufactured by Titus unless shown otherwise.
- B. Any substitutions of the above equipment which may be proposed by the Contractor shall be re-sized to suit his equipment by the proposed manufacturer and submitted in tabular form listing components proposed for each location in the System, identifying each as to location, design, air quantity passing through the devices, pressure drop, noise criteria data, velocities of air leaving the device and "K" flow factors for each item. Manufacturer's data sheets showing dimensions and recommended method of installation for each component must also be included.

2.03 Louvers

- A. 4" deep louvers, Greenheck, Model ESJ-401, or approved equal. Deflection blades shall be spaced on 4" centers having 1/2" high vertical baffle and an additional lateral center rain hood. The edges of louver blades shall be folded or beaded to exclude driving rain. Louvers blades shall be oriented to minimize the entrainment of rainwater. Louver blades, heads, sills, jambs, braces and mullions shall be made of aluminum. Louvers shall be provided with flanges.
- B. Provide 1/2" aluminum bird screen on outside air intake louvers and 1/4" aluminum insect screen on combustion air louvers.

2.04 Rectangular Sheet Metal Ductwork

- A. Rectangular supply, return, outside air and exhaust ducts, single leaf dampers and plenums shall be fabricated from prime grade galvanized steel sheets of lock form quality and shall be constructed in accordance with appropriate tables of the latest ASHRAE "Guide and Data Book" and SMACNA "HVAC Duct Construction Standards" handbook and Chapter 6 of the 2019 CMC.
- B. Transverse Duct Joints shall be made with The Ductmate System. When using The Ductmate System, construction of the duct such as gage, reinforcing, etc. shall be as indicated in the latest addition of the applicable SMACNA standards. With proper data, an equal may be submitted, providing the corners have a downset and corner clips to insure airtight integrity. Testing must be done by a nationally recognized testing laboratory. The standard Ductmate 35 System joint is the equivalent of a SMACNA "J" connection. The Ductmate 25 System joint is the equivalent of a SMACNA "F" connection. The installation of the Ductmate System shall be in accordance with the latest manufacturer's printed Assembly and Installation Instructions.
- C. Each duct or plenum shall be diagonally cross-broken for rigidity.

- D. Duct bends, fittings, transitions, etc. shall be fabricated in accordance with Fabrication Standards as shown on the Drawings or in accordance with latest SMACNA "HVAC Duct Construction Standards" where not shown on Drawings.
- E. Support ducts to joists or similar structural members. Except where indicated otherwise, ducts with a side of 24" or more shall be supported on Ductmate trapeze duct hangers consisting of 2" high x 1-1/2" wide x 18" gauge channel and 3/8" diameter hanger rods hung from support brackets bolted to structural members. See also Special Fabrications as shown on the Drawings. Duct supports shall be eight (8) feet maximum on center.
- F. At branch ducts, provide manually operated dampers of the type and arrangement shown on the Drawings, two gages heavier than the duct (if single leaf type) in which installed, and equipped with locking quadrants and closed end bearings.
- G. Sizes shown on Drawings are net inside dimensions. Enlarge duct to accommodate lining.

2.05 Round Ductwork And Fittings

- A. 2-10" w.g. round duct through 61" in diameter shall be United Sheet Metal spiral lockseam unseal duct, or approved equal, manufactured from galvanized steel meeting the ASTM A-527-71 in the following gages:

Diameter	Metal Thickness
3-13"	26 ga.
14-23"	24 ga.
24-37"	22 ga.

- B. Round duct shall be new and exclusively obtained for this project. Each piece shall be in 20' lengths. Ducts shall be cut to length required with joints only at fitting locations, except on duct runs longer than 20 feet.
- C. Spiral duct and fitting connections, 15" diameter and larger shall be Ductmate Spiralmate round duct connectors. The connector system shall consist of two mating round duct connector flanges roll-formed from hot dipped galvanized steel with an integral sealant and closure ring roll-formed from hot dipped galvanized steel.
- D. Fittings shall be United Sheet Metal galvanized fittings in the following gauges:

Diameter	Metal Thickness
3-13"	24 ga.
14-23"	22 ga.
24-37"	20 ga.

- E. Spiral duct fittings must be manufactured as separated fittings and shall not be saddle taps, stubs or tap-in fittings tapped into spiral duct, nor may they be dove-tailed tap-ins into pipe or fittings.
- F. Reducers shall occur after a branch tap occurs on the main portion of the fitting. Divided-flow fittings shall be used unless shown otherwise on the Drawings.

- G. Joints on ducts and fittings shall be covered and sealed with 4" wide, 6 oz. canvas saturated with Arabol lagging adhesive, or Hardcast DT tape in conjunction with Hardcast FTA-20, non flammable, non-toxic adhesive, or GlenKote duct sealer or other approved mastic type sealer. Duct tape will not be allowed. Where exposed to weather, paint lagging strips with two coats of silver enamel paint.
- H. All ductwork shall be constructed and supported in accordance with appropriate tables of the latest SMACNA "HVAC Duct Construction Standards" handbook and Chapter 6 of the 2019 CMC. Duct gauges to be in accordance with 2.6.A and 2.6.D of this section.
- I. At branch ducts, provide manually operated dampers of the type and arrangement shown on the Drawings, two gages heavier than the duct (if single leaf type) in which installed and equipped with locking quadrants and closed end bearings.

2.06 Flexible Duct

- A. Flexible air duct shall be Hart & Cooley Model F218. Duct shall consist of an inner core having two layers of polyester film encapsulating a steel wire helix surrounded by a blanket of fiberglass insulation and sheathed in a metalized polyester vapor barrier reinforced with fiberglass scrim. All air ducts shall be UL listed under the UL-181 standard as a Class 1 Air Duct also conforming to NFPA standards 90A and 90B. This air duct shall have a certified thermal resistance rating of R-8 in accordance with ASTM C518 at 75°F and carry the ADC "Thermal Performance" seal.
- B. Use only the minimum length required to make the connection. In no case shall any section of flexible duct exceed 5 feet in length.
- C. Use two layers of UL listed 181 duct tape to connect flexible duct to the metal duct if flexible duct does not have S.M. collars.
- D. The number of bends shall not exceed a combined total of 90 degrees. 90 degree bends will not be allowed at diffuser connections.

2.07 Flue Vent Pipe And Fittings

- A. Type B double wall vent pipe with UL label shall be used for gas burning appliances, except gas wall furnaces and gas appliances with power burners. Install per manufacturer's recommendations.
- B. Flues or vents shall terminate above the roof with flashing and a listed vent cap installed in accordance with its listing and the manufacturer's instructions. Flues or vents shall terminate as required per current CMC.
- C. Vent cap shall be of the same manufacturer as the flue pipe.
- D. For condensing furnaces: M&G DuraVent PolyPro venting system: Inner pipe a minimum of 2.2mm thick polypropylene pipe. Exterior metal pipe made of galvalume. ULC-S636 gas vent –BH. Class II venting system, installed per manufacturer's recommendations.

2.08 Duct Specialties

- A. Damper Regulators and Bearings: Duro-Dyne "Specline" SR-Series or approved equal, lever type with matching end bearing. Regulator set shall include rubber gasket between regulator and duct, spring washer between core and housing, wedge pin, dial indicator and handle. Matching end bearing shall be closed end with rubber gasket:

Model	Size
148	10" and Under
388	20" and Under
128	21" and Above

- B. Access Panels: Access panels shall be located at all points where adjustable mechanisms are installed internal to or on the surfaces of the ductwork. Where adjustable mechanisms are concealed by walls or ceilings, "Elmdor" or approved equal access doors shall be installed. Size shall be suitable for convenient servicing. Tile Walls: Doors and Frame: Stainless Steel. Other areas: recess type to receive ceiling or wall finish in order to provide "Blind Finish".
- C. Fire Dampers: Fire dampers shall be installed where shown on the Drawings and/or required, and shall be of a type approved by the U.L. Laboratories, Inc. and the State of California Fire Marshal. Dampers shall be installed per manufacturer's instructions. Provide access door in duct at each fire damper such that damper is easily accessible.
- D. Volume Dampers:
1. In rectangular ducts greater than 1.5 sq. ft., provide Pottorff Model CD42, or equal, factory fabricated opposed blade damper, 16 gauge blades, and brass bearings. Blade width shall not exceed six inches.
 2. In rectangular ducts 1.5 sq. ft. and less, provide single leaf dampers as described in Section 23 00 00, 2.3 (a. and g.).
 3. In round ducts 15" in diameter and less, provide shop fabricated galvanized sheet metal plate dampers. Plate shall be 18 gauge or shall be two even gauges heavier than duct; minimum thickness 22 gauge. Provide stiffening beads at 1/3 points in dampers lighter than 18 gauge.
 4. In round ducts 16" and greater, provide Pottorff opposed blade damper Model CD22R or approved equal.
 5. In round ducts 4" – 24" in diameter, above "hard" ceilings, provide DuroZone Cable Operated Damper. Cable length to be between 3 and 15 FT long. Contractor to determine proper length to be use. Cable shall be routed inside the duct to the face of the grille or diffuser. Tuck cable up behind diffuser after balancing.
- E. Provide 20 gauge galvanized sheet metal escutcheon plates at duct penetrations of finished building surfaces. Install tight against surface and securely attached to duct. Continue insulation through openings.
- F. Duct Mounted Access Doors:
1. In rectangular duct provide, DuroDyne Model IAD, Ductmate "Sandwich", or equal, insulated, duct mounted access doors with Cam-Lock operated latches where shown on drawings or required for access to duct mounted equipment.

- Doorframe shall be 24-gauge with double wall door and 1/2" glass fiber insulation. Size doors to provide easy access to equipment.
2. In round ducts, provide Ductmate - METU round duct access doors, fully insulated, with attached gasket and springs between inner and outer door. Access doors shall be as large as practical as duct size will allow.

2.09 Flexible Connections

- A. Provide fireproof, insulated, non-porous, flexible connections between fans and ducts or casings and where ducts are of dissimilar metals. For round ducts, securely fasten flexible connections by zinc coated steel clinch-type drawbands. Flexible connections shall be DuroDyne "Insulfab" or "Insulflex" or approved equal.
- B. Provide a duct support next to each flex connector to prevent any strain on connection.

2.10 Duct Smoke Detectors:

- A. HVAC systems rated at 2000 CFM or greater shall be equipped with a duct smoke detector to automatically shut off the HVAC system if smoke is detected.
- B. The detectors shall be installed in the main supply duct downstream of any filters, in the main return air duct after the last terminal connection and the any exhaust duct after the last terminal before the fan.
- C. The detector shall be System Sensor Innovairflex D4120 4-wire Photoelectric Smoke Detector. Provide with Factory NEMA 4 enclosure if mounted outside.

2.11 Damper Actuator

- A. Actuators shall be Belimo. Substitutions will not be acceptable. Actuator shall be direct coupled over the shaft, spring return type, unless specified otherwise

2.12 Electrical Equipment

- A. Motor starters shall be provided complete with properly sized thermal overload protection and other appurtenances necessary for motor control specified. Mount starter adjacent to equipment. See electrical drawing. Maintain minimum of 3' clearance to front of device.
- B. Motor Starters: Shall be NEMA I or III as appropriate, general purpose, weather-resistant, with watertight enclosure where required.

2.13 Insulation

- A. General: Insulation and lining material shall meet requirements of flame spread not to exceed 25 and smoke developed not to exceed 50 as tested by Procedure ASTM-E-84, NFPA 255 or U.L. 723 and shall conform to NFPA 90A and 90B.
- B. Heating and cooling duct and related heating and cooling equipment insulation shall conform to 2015 Building Energy Efficiency Standards, Administrative Regulations,

Title 24, Part I, Section 124, except to the extent that this Specification supersedes the minimum standards as established by the Code, in which case this Specification shall take precedent.

- C. Unless noted otherwise, insulation shall be Fiberglass, or approved equal material. Application Work shall be performed in accordance with the best accepted practice of the trade and the manufacturer's recommendations. The performance of insulation Work shall be by experienced insulation applicators. Insulation shall be installed after the specified tests have been applied to the piping and duct systems, and the systems have been inspected and approved. Fiberglass trade names and/or numbers have been used to establish a standard of quality.
- D. External Duct Insulation – Outdoors, in a space between the roof and an insulated ceiling, in a space directly under a roof with fixed vents or openings to the outside or unconditioned spaces, in an unconditioned crawlspace; or other unconditional spaces: Shall be applied to concealed heating and cooling, supply and return duct except duct that is internally lined. Insulation on duct shall be Manville Microlite FSK duct insulation, 3" thick, minimum installed R value of 8.0 or greater, FSK aluminum foil reinforced with fiberglass, scrim laminated to U.L. rated Kraft, or approved equal. Adhere to duct surfaces with Foster's 85-62 or approved equal, adhesive applied in strips of 6" wide on approximately 12" centers. Circumferential seams shall be butted together and sealed over joints with 3" wide pressure sensitive foil vapor barrier tape. Longitudinal edges shall be lapped 2" and secured with outward clinching staple 6" on center then sealed with pressure sensitive foil vapor barrier tape. Duct wrap shall be installed to allow maximum fullness at corners (avoid excessive compression) minimum thickness at corners shall be 1". Where ducts are over 24" in width, the duct wrap shall be additionally secured to the bottom of the rectangular ducts with mechanical fasteners spaced on 18" centers (Max.) to prevent sagging insulation.
- E. External Duct Insulation – All other locations not listed above: Shall be applied to concealed heating and cooling, supply and return duct except duct that is internally lined. Insulation on duct shall be Manville Microlite FSK duct insulation, 2" thick, type 100, minimum installed R value of 6.0 or greater, FSK aluminum foil reinforced with fiberglass, scrim laminated to U.L. rated Kraft, or approved equal. Adhere to duct surfaces with Foster's 85-62 or approved equal, adhesive applied in strips of 6" wide on approximately 12" centers. Circumferential seams shall be butted together and sealed over joints with 3" wide pressure sensitive foil vapor barrier tape. Longitudinal edges shall be lapped 2" and secured with outward clinching staple 6" on center then sealed with pressure sensitive foil vapor barrier tape. Duct wrap shall be installed to allow maximum fullness at corners (avoid excessive compression) minimum thickness at corners shall be 1". Where ducts are over 24" in width, the duct wrap shall be additionally secured to the bottom of the rectangular ducts with mechanical fasteners spaced on 18" centers (Max.) to prevent sagging insulation
- F. Internal Duct Insulation - Outdoors, in a space between the roof and an insulated ceiling, in a space directly under a roof with fixed vents or openings to the outside or unconditioned spaces, in an unconditioned crawlspace; or other unconditional spaces: Shall be applied to all heating and cooling supply and return duct and plenums on roof or where shown on Drawings. Manufacturer shall be Manville Microlite, or approved equal. Duct Liner shall be Linacoustic R, 2" thick, 1.5 pcf, with a "K" value of 2.2 in. for

a total "R" installed value of 8 or greater. Insulation shall withstand velocities of up to 5000 FPM and temperatures up to 250 degrees F.

- G. Internal Duct Insulation – All other spaces not listed above: Shall be applied to all heating and cooling supply and return duct and plenums where shown on Drawings. Manufacturer shall be Manville Microlite, or approved equal. Duct Liner shall be Linacoustic R, 1 ½" thick, 1.5 pcf, with a "K" value of 2.2 in. for a total "R" installed value of 6 or greater. Insulation shall withstand velocities of up to 5000 FPM and temperatures up to 250 degrees F
- H. Portions of duct receiving Duct Liner shall be completed with transverse joints neatly butted with no gaps or interruptions. The duct liner shall be adhered to the sheet metal with 100% coverage of adhesive and exposed leading edges and transverse joints coated with adhesive. Adhesive shall be a water based product. In addition, this shall be secured with mechanical fasteners which shall compress the liner sufficiently in place. The liner shall be cut to assure overlapped and compressed longitudinal corner joints. Application procedures shall comply with the recommendations of the Sheet Metal and Air Conditioning Contractor's National Association's Duct Liner Application Standard, Second Edition.
- I. External Duct Insulation Exposed to Weather: Shall be applied to heating and cooling supply and return ducts and plenums exposed to weather if not noted to be internally insulated. Insulation shall be Knauf Type ASJ, or approved equal, rigid board fiberglass, 3.0 # per cubic foot minimum density, 2" min. thickness, 8.0 min. R value. The board shall be neatly cut and fitted to the surface with joints tightly butted together and against standing seams. The insulation shall be secured to the duct with adhesive and mechanical fasteners starting 3" from butt joints and 18" on center each direction. Vapor-barrier tape shall be then applied over joints, seams, breaks and any penetrations of the insulation vapor barrier jacket. A weather-barrier mastic compound reinforced with fabric or mesh shall be applied as a finish coat. Finish by painting with two (2) coats of aluminum paint.
- J. Ducts: Ducts shall be constructed, installed, sealed and insulated in accordance with the 2019 CMC. The above paragraph(s) shall supersede if more stringent.

2.14 Temperature Controls

- A. Temperature controls shall be furnished as indicated in schematic Drawing on Plans including room thermostats, relays and other necessary combustion, operating and safety controls.
- B. Wiring and Conduit
 - 1. Control wiring and conduit shall be the responsibility of this section and be installed as follows:
 - a. In equipment rooms/attics – Conductors shall be run in conduit. Final connection to equipment shall be flexible conduit.
 - b. Concealed in building construction (wall/inaccessible ceilings) - Conductors shall be run in conduit.
 - c. Roof mounted/exterior equipment yards – Conductors shall be in conduit. All flexible conduit shall be seal-tite with weatherproof connections. Equipment on grade and detached from the building a

- distance greater than 36" shall have underground control conduit routed to equipment.
- d. Above accessible ceiling spaces – Control cable will be allowed to be installed without conduit in accessible areas above ceilings as follows:
 - 1. Cable is an approved type for the application.
 - 2. Cable is bundled/organized in management devices routed square with building lines (no diagonals) and kept clear of electrical devices (i.e., ballasts, transformers, etc.) that could cause interference.
 - 3. Conduit sleeves are provided between accessible ceiling spaces (i.e., across soffits, gypboard ceilings, etc.) as required to maintain future access to cable.
 - e. Cable routed in accessible ceiling spaces shall comply with EIA/TIA standards for communications cabling. Communication bus wire shall be W183C-2058Y Connect Air, yellow shielded cable.
- C. Electric wiring, conduit and other electric devices required to complete the installation of the temperature control systems shall comply with requirements as set forth in the Electrical Section of this Specification.
- D. After completion of the installation, the Contractor shall adjust thermostats, motors and other equipment provided under this Contract. He shall place them in complete operating condition subject to approval of the Architect.
- E. The Control System herein specified shall be free from defects in workmanship and material under normal use and service. If, within twelve (12) months from date of acceptance by the Architect, any of the equipment herein described is proved to be defective in workmanship or material, it will be adjusted, repaired or replaced free of charge by the Contractor.
- F. The final connections and supervision of control wiring and interlock wiring shall be the responsibility of this Contractor.
- G. The Contractor shall submit to the Architect for approval, the required number of shop drawings of the entire control system before starting Work.
- H. Upon completion of the Work, the Contractor will provide diagrammatic layouts of the Automatic Control Systems specified herein. Layouts shall show control equipment and the function of each item shall be indicated.
- I. The temperature control system shall be installed by persons in the direct employment of the temperature controls manufacturer(s) exclusive contracting representative. The Mechanical Contractor shall not install the temperature controls unless pre-approved by the Mechanical Engineer.

2.15 Refrigerant Piping

- A. Refrigerant piping shall be flushed clean with nitrogen and the ends capped prior to installation. Refrigerant piping shall be Type L copper with wrought copper fittings. Use

45% minimum silver brazing alloy with melting point higher than 1100 F. for making the joints.

- B. Insulate refrigerant suction line with 1-1/2" thick Owens-Corning Fiberglass or Armstrong Armaflex foamed plastic flexible tubing insulation applied with No. 500 adhesive. Use multiple layers and miter insulation to cover joints and all other items as required to prevent condensation.
- C. VRV OR VRF and Heat pump systems: Insulate all refrigerant lines with 1-1/2" thick Owens-Corning Fiberglass or Armstrong Armaflex foamed plastic flexible tubing insulation applied with No. 500 adhesive. Use multiple layers and miter insulation to cover joints and all other items as required to prevent condensation.
- D. When piping & insulation are installed outside of building, insulation shall be aluminum jacketed. Jacketing shall be minimum 0.016" thick, 3105 or 3003 alloy aluminum with moisture barrier & stucco embossed finish. Provide aluminum elbow covers at all pipe bends equivalent in construction to jacketing.

2.16 Refrigerant Piping Accessories

- A. Stop valves shall be Henry Type 622, 500 psi pressure rating brass, soldered, packless diaphragm, globe shut-off pattern.
- B. Solenoid valves shall be Sporlan Type MA14, 450 psi rating, brass body.
- C. Filter dryer shall be Sporlan "Catch-All" with soldered connections.

PART 3 EXECUTION

3.01 Surface Conditions

- A. Examine the areas and conditions under which Work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 Coordination

- A. Coordinate as required with other trades to assure proper and adequate provision in the Work of those trades for interface with the Work of this Section.

3.03 Preparation

- A. Holes in concrete:
 - 1. Provide sleeves, accurately dimensioned and shaped to permit passage of items of this Section.
 - 2. Deliver such sleeves, with accurate setting drawings and setting information, to the trades providing the surfaces through which such items must penetrate, and in a timely manner to assure inclusion in the Work.

- B. Flashing:
 - 1. Where items of this Section penetrate the roof, outer walls, or waterproofing of any kind, provide under this Section base flashing and counterflashing required at such penetration.
 - 2. Provide on each pipe passing through the roof a 4 pound seamless lead flashing and counterflashing assembly.

3.04 General Installation Requirements

- A. Conceal piping, ductwork, and equipment in spaces provided unless specifically shown otherwise. If spaces are inadequate, notify Architect in time to avoid unnecessary Work. Do not cut or notch structural members without specific approval of the Architect.
- B. Follow manufacturer's instructions on items not specifically covered in drawings and specifications. Report discrepancies to Architect for clarification before starting Work.

3.05 Equipment Interface

- A. Provide required shut off valves, unions, and final connections of piping to the Work of this Section.
- B. For electrically operated equipment, verify the electrical characteristics actually available for the Work of this Section and provide equipment meeting those characteristics.

3.06 Painting

- A. Paint inside of air outlets and connecting plenums with one coat of flat black paint, or provide all such items factory prepainted.
- B. For roof-mounted equipment, provide factory pre-finish on exposed surfaces.
- C. Touch-up scratches and abrasions to be invisible to the unaided eye from a distance of 5 feet.

3.07 Installation Of Ductwork

- A. Ductwork shall be delivered to the Project site with surfaces clean and free of loose dirt and rust. Special care shall be exercised by the Contractor to store the duct in a clean area to prevent the accumulation of dirt prior to installation. Fabricated or partially fabricated duct sections shall not be stored in open fields or on dirt areas surrounding the construction site. Paved areas may be used, if available, provided adequate protection is provided to prevent the accumulation of dirt on duct surfaces. If possible, the Contractor should arrange to deliver duct to the project site and store on the floor of the area in which it is to be installed.
- B. Before installation of ductwork, the Contractor shall inspect each section of duct and wipe internal surfaces clean. At the end of each Work period, or when ends of duct are left installed for future extension, the open ends shall be tightly closed off with a plastic sheet and taped securely to the open end of the duct.

- C. Construct and install sheet metal in accordance with latest SMACNA recommendations. Provide variations in duct size and additional duct fittings as required and approved by the Architect at no extra cost to the owner.
- D. The throat radius of bends shall be 1-1/2 times the width of the duct. Provide turning vanes in any mitered turn greater than 45 degrees.
- E. Transition slopes shall be no less than one to five where space permits.
- F. Abrupt offsets in the duct system greater than 30 degrees will not be allowed.

3.08 Temperature Control Installation

- A. Install wiring and tubing parallel to walls and floors and securely clipped to structure or mechanical system components. Group parallel runs for neat appearance.
- B. Install room thermostats and other control devices at 48 inches above finished floor unless a lower mounting height is required for access by handicapped.
- C. Install outside air sensor in a location where it is not directly affected by radiation from the sun or any heat generating device or by a conditioned air stream or any other location that would produce a false reading.
- D. Upon completion of the installation calibrate all equipment and adjust controls for proper operation.

3.09 Refrigerant System Charging Procedure

- A. Pressurize the system with refrigerant and hold for 24 hours with no drop in pressure; test joints and equipment for evidence of leaks after satisfactory pressure test.
- B. Provide 1/2" angle type charging and purging valves adjacent to high and low side of the condensing unit to accomplish the procedure described hereinafter. Connect the vacuum pump to both the high and low side of the system. Do Work when ambient air temperature is above 60 degrees F during the evacuation process.
- C. Operate the vacuum pump until the system is evacuated to 2.5 mm Hg absolute. Break the system vacuum with nitrogen or refrigerant.
- D. After the system has been evacuated to 2.5 mm Hg absolute, close the vacuum pump suction valve and stop the pump.
- E. Charge system to required capacity with specified refrigerant.

3.10 Control Device Identification Labels

- A. Thermostats and Exhaust fan switches shall have labels mounted on or just above the control device labeled with the equipment being controlled. As an example, for a exhaust fan controlled by a switch the label would read "EXHAUST FAN # 1" or if a thermostat the label would read "AC-1".

1. Labels shall be 2" x 1" x 1/8" thick Formica/plastic engraving stock beveled on both sides and with two 3/16" diameter holes near the top uppermost tag corners.
2. Labels shall be white with 3/8" high red engraved letters.
3. Labels shall be attached to the equipment with adhesive.

3.11 Warranty

- A. The contractor shall warranty all of the systems for proper operation installed by the contractor for not less than one calendar year from date of project completion. This completion date shall be set by the Architect or owner.

3.12 Shop Drawings

- A. The Contractor shall prepare shop drawings covering duct systems, equipment and Mechanical Room piping systems. The drawings shall be prepared in 3/8" scale and shall be submitted to the Architect for approval prior to any fabrication. In preparing the shop drawings, the Contractor shall coordinate the location of duct, piping and equipment with the Work of other trades.

3.13 Mechanical System Start-Up Responsibility

- A. Start up Mechanical Systems, and perform any such Work as may be required to adjust the systems to meet the requirements of the Contract Documents. Air distribution balancing shall be performed in accordance with Article "MECHANICAL SYSTEMS BALANCING".
- B. Install new clean specified filters in equipment containing filters immediately prior to owner occupancy. Contractor to bear all costs for this work.

3.14 Mechanical Systems Balancing

- A. Testing and air balancing shall be performed by an independent balancing company certified by Associated Air Balance Council (AABC) or National Environmental Balancing Bureau (NEBB). Testing and balancing shall be performed by a company other than the mechanical system installers/contractor. The name of the firm that the Contractor proposes to engage to perform this Work of balancing the system shall be submitted to the Engineer for approval prior to commencing the Work.
- B. After Systems have been tested as outlined, air and water flow rates shall be balanced, and control devices adjusted. Balance and testing shall not begin until systems have been completed and are in full working order. Upon completion of the balancing operation and prior to final acceptance of the systems, the balancing firm shall submit a report, with six (6) copies, certifying to the proper performance of the system for approval by the Mechanical Engineer.
 1. The following information shall be included in the Air Side Report:
 - a. Fan speeds.
 - b. Motor current readings and voltage readings.
 - c. Air quantities in CFM at supply, return, exhaust terminals, and outside air intakes, both at design value and actual measured value. Test and adjust each terminal to within +10% of design requirements.

- d. Air velocities in FPM at supply, return, and exhaust terminals at design value and actual measured value.
- e. Positive static pressure, negative and total pressures and total air quantities for each fan system.
- f. Equipment nameplate data.
 - 1. Air and Water Temperature Rise on Drop
 - 2. Air and Water Pressure Drops

END OF SECTION

Section 23 00 13
General Mechanical Requirements

PART 1 GENERAL

1.01 Description

- A. Related Documents:
 - 1. The other Contract Documents complement the requirements of this Section.
 - 2. Division 1 - General Requirements applies to the Work of this Section.
 - 3. Where requirements of this Section exceed those in other Contract Documents, Contractor shall comply with the requirements of this Section.
- B. Codes and Regulations:
 - 1. In addition to complying with the specified requirements, comply with pertinent regulations of governmental agencies having jurisdiction.
- C. Included: Work includes, but is not limited to the following:
 - 1. Heating, Ventilating, Air Conditioning and System Balancing
 - 2. Plumbing
 - 3. Fire Protection
 - 4. Carpentry and metal Work required for Work of this Section and not specifically shown under another Section. Openings in concrete or masonry construction shall be either core drilled or saw cut unless indicated otherwise on Drawings.
 - 5. Excavation and Backfill
 - 6. Coordination Drawings
 - 7. Demolition:
 - 8. The Demolition Plans were prepared for the convenience of the Contractor. The Engineer does not represent that all items, which may require demolition, have been shown. It shall be the responsibility of the Contractor to carefully examine the site and the Contract Documents and to perform all demolition and reconstruction, which may be required for the proper execution, and completion of work.
- D. Related Work:
 - 1. Painting (Division 9)
 - 2. Cutting and Patching (Division 1)
 - 3. Low voltage electrical control (Division 16)

1.02 Definitions

- A. Furnish: Purchase and deliver to job site in new condition.
- B. Install: Receive and store at job site until required; place secure and connect; furnish required appurtenances.
- C. Provide: Furnish and install as defined above.
- D. Section: Refers to a Section of these Specifications.

- E. Standards: The issue in effect as of the date of the contract documents.

1.03 Project Record Drawings

- A. Comply with pertinent provisions of Architectural Sections (Division 1).

1.04 Service Interruptions

- A. When Work of this Section requires temporary shutdown of existing systems for connections, the shutdown shall be made only during pre-arranged time agreeable to the Owner.

1.05 Correlation, Interpretation And Intent Of Contract Documents

- A. The Mechanical Drawings are, in general, made to scale and the Contractor may obtain approximate distances and dimensions by scaling the Plans. It is distinctly understood, however, that it is done entirely at the Contractor's responsibility. Refer to Architect's Plans and Specifications for construction details, which will affect the Work and equipment. Examine the Architectural, Civil, Structural, Mechanical, Electrical, Landscape, Irrigation, Data, Fire Protection and Plumbing Plans and Specifications to ensure that this work does not conflict with the above trades. Plumbing, Mechanical and Electrical Plans are diagrammatic and, therefore, do not necessarily represent the exact installation. However, pipe sizing for utility services and ductwork are calculated per their respective codes and Standard Engineering Practice and shall be installed as sized from point of origin to terminal point. It shall remain the Contractor's responsibility to submit Shop Drawings if he/she has any questions about the final arrangement. Nothing on these Plans or Specifications shall be construed to permit work not conforming to all applicable codes and regulations.

PART 2 PRODUCTS

2.01 Access Panels

- A. If not called for under other Sections, furnish Milcor, Elmdor, or Jay R. Smith access panels where shown on the Drawings or required for maintenance access to completed Work of this Section. Submit size, type, and location of proposed access panels not specifically shown, for review by Architect.
- B. Access panels shall be constructed of 16 gauge prime coated steel or stainless steel with screwdriver operated cam latch, concealed hinges, and fire rating equal to adjacent construction.
- C. Provide flush type doors with:
 - 1. Stainless steel finish for tiled surfaces.
 - 2. Prime coated finish for other surfaces.

2.02 Flashing

- A. Provide watertight flashing at all openings through exterior walls and roof. Refer to Architectural Drawings.

2.03 Belt Drives

- A. All belts shall be "Vee" type, or approved equal. Sheaves shall be adjustable and shall be sized to drive fan at scheduled RPM when set at midpoint of adjustment range. All belt drive assemblies shall be rated at 150% of drive motor horsepower. OSHA approved belt guards shall be provided over all drive assemblies. The Contractor shall change any belts and drives as required to produce the specified CFM.

2.04 Vibration Isolation And Noise Control

- A. All fans, heating and ventilating units, air conditioning units, blowers and similar equipment shall be securely mounted to and/or supported from the structure.
- B. Isolate all bare water piping from structural members or hangers with "Trisolators" or submitted and approved equal insulating sleeves. Install hangers on outside of insulated jacket on all insulated lines.

2.05 Weatherproofing

- A. All equipment exposed to weather shall be protected by means of a suitable finish (i.e. paint). All fan cabinets, roof-mounted equipment, and ductwork shall be fabricated in such a manner to prevent leakage through seams and joints. Water rated, exterior hoods shall be provided over motors, belts, and other devices to insure against damage by water. At all locations where pipes and/or ducts penetrate exterior walls, or roofs, suitable rain tight flashing shall be provided.

2.06 Pipe Wrapping

- A. All pipe, metal components, and joints buried in ground shall be primed and protected with 10-mil tape double wrapped or approved equal per IAPMO IS 13-2006. Before tape application, all bare pipe and fittings to be wrapped must be coated with pipe wrap primer. Stretch first layer of tape to conform to the surface while spirally half-lapping, apply a second layer, half-lapped and spiraled as the first layer with spirals perpendicular to first wrapping. In lieu of tape wrap, heat shrinkable 10-mil minimum thick polyethylene sleeve may be used.
- B. When applying tape, use only enough pull to cause the tape to properly conform to the irregular surfaces of the item. The proper amount of pull is reached when the tape surface is smooth without any wrinkles. Continue tape 4" above grade. End overlaps should point down. Tape shall be applied per manufacturer's installation instructions.

2.07 Electric Motors And Electrical Devices

- A. All Electric motor current characteristics are as shown in equipment schedules on drawings and as specified hereinafter in this Specification. The Contractor shall refer to the Electrical Plans and shall confirm all motor voltage, amperage and phase characteristics before processing submittals or ordering equipment. If any equipment is

installed different from the supplied electrical power, it is the contractor's responsibility to correct equipment to the required electrical characteristics.

- B. All electrical devices of a type normally listed by Underwriters Laboratories, Inc. shall bear U.L. label of approval.
- C. Motor starters shall be provided complete with properly sized thermal overload protection and other appurtenances necessary for motor control specified. Mount starter adjacent to equipment. See electrical drawing. Maintain minimum of 3' clearance to front of device.
- D. Motor Starters: Shall be NEMA I or III as appropriate, general purpose, weather-resistant, with watertight enclosure where required.

PART 3 EXECUTION

3.01 General Equipment Installation Requirements

- A. Install equipment to provide neat appearance, required manufacturer's access, and required space to allow replacement or maintenance. Provide bases, supports, anchor bolts, and other items required to install equipment. Installation shall be level and braced per CBC.
- B. Equipment shall operate quietly and without objectionable vibration. Excessive vibration, other than from specified equipment operating at optimum conditions, shall be the Contractor's responsibility and shall be eliminated as directed by Architect.

3.02 Coordination Of Work

- A. Coordinate Work of this Section with Work of other Sections to avoid conflicts. If required, provide shop drawings and submit to Architect for approval.
- B. Insure that Work of other Sections is suitable to accommodate Work of this Section.

3.03 Adequacy Of Furring

- A. Conceal piping and ductwork in spaces provided unless specifically shown otherwise. If spaces are inadequate, notify Architect prior to ordering materials and fabrication of components.

3.04 Protection And Cleaning

- A. Protect equipment from dirt, moisture, and mechanical damage during construction. Restore or replace damaged equipment to original condition.
- B. Keep interior of piping and ductwork free of foreign material during construction. Flush piping systems with test medium specified under Piping Tests before installing equipment and appurtenances or making final connections.

3.05 Closing-In Of Uninspected Work

- A. Do not conceal or cover Work before tests and observations are completed. Uncover Work prematurely closed in and repair resulting damage to all Work, if requested by Architect, Engineer, or Project Inspector.

3.06 Damage

- A. Repair or replace items damaged by leaks or overflow from Work provided under this Section and for any damage to any part of the project site, for a period of 1 year after notice of completion date. This is in addition to and not a limitation of other rights the Owner may have against the contractor under the Contract Documents.

3.07 Mechanical System Testing

- A. Furnish all test pumps, gauges, and equipment. Test all safety controls and devices.
- B. For air tests, install a calibrated test pressure gauge in the piping system to observe any loss in pressure. Calibrate the test pressure gauge with a dead weight tester within 15 days before use and certify by initial and date on a sticker applied to the dial face. Maintain the required test pressure for the time indicated. Brush joints with a soapy water solution to check for leaks if the required pressure cannot be maintained.
- C. After any test, repair all leaks found as directed and re-test as necessary until the system is proven tight.
- D. Before applying test pressure to any piping systems the Contractor shall be responsible for isolating all equipment e.g. control valves, regulators, relief devices, tanks and any other line accessories, which would otherwise be damaged by the test pressure.
 - 1. Soil, Waste, Vent, Roof, and Condensate Drainage:
 - 2. Entire System: Tightly close all openings except the highest one. Fill to overflowing with water.
 - 3. Sections of System: Tightly close all openings except the highest opening of the section under test. Fill section with water to test each section with a minimum 10-foot head of water except for the uppermost 10 feet of the system.
 - 4. Allow to stand for (4) hours or longer, as required to complete the inspection.
 - 5. Domestic Water: Fill with water and test at 150 psig. Retain for (4) hours.
 - 6. Gas Piping: Air test to pressure equal to one and one-half times the design pressure, but in no case less than 50 psig. Retain for four hours.
 - 7. Refrigerant: Pressurize the system with nitrogen to 150 psig and hold for 24 hours with no drop in pressure; test joints and equipment for evidence of leaks after satisfactory pressure test.
- E. After all Systems have been tested as outlined, all flow rates shall be balanced, and all control devices adjusted. See Section 23 00 00.
- F. The equipment and installations shall be operated by the Contractor and he shall demonstrate that all Systems are performing according to the requirements of the Plans and Specifications and to the satisfaction of the Architect, Engineer and Owner.

- G. Acceptance Testing Requirements: For applicable acceptance tests see the energy compliance documentation. Acceptance testing shall be the responsibility of the mechanical contractor and shall be performed by an Acceptance Testing Technician who has been certified by a California Energy Commission approved Acceptance Test Technician Certification Provider Program. The Test and Balance Contractor can also be the Acceptance Testing Technician

3.08 Cutting And Patching

- A. The Contractor shall do all cutting and patching which may be required for the installation of the Work under this Division of the Specifications. Patching shall be of the same quality, materials and finish as, and shall match accurately, all surrounding construction. No cutting of the Structure shall be permitted without the approval of the Architect.
- B. Wherever concrete or paved surfaces are cut to provide for the installation under this Section, the Contractor shall restore the surfaces to their original condition. Subgrade materials, concrete, and paving materials, along with the placement of same, shall be in accordance with the respective Sections of this Specification as they apply to the installation of such material.

3.09 EXCAVATION AND BACKFILL: (Buried Pipes Within The Building Walls And To 5 Feet From The Building.)

- A. Dig trenches straight and true to line and grade; bottom shall be left smoothed of rock points. Pipe shall be supported for the entire length on undisturbed, original earth. The minimum trench width shall be 16" and all pipe shall be 2 feet below the finished grade, minimum, wherever conditions permit. Sewer pipes to be below grade as necessary to meet the slope and invert on the Drawing. Whenever substantial variations of pipe bury is indicated by field conditions, the proposed changes in depth of bury shall be submitted, in writing, to the Architect for approval.
- B. All piping shall be laid on a bed of clean dry sand not less than 6" thick. The space between the pipe and the sides of the trench shall be backfilled with clean dry sand to a point 6" above the crown of the pipe. Both sides of the pipe shall be filled at the same time.
- C. The remainder of the trench shall be backfilled with native soil in lifts no greater than 12" and shall be mechanically compacted by tamping so to maintain a minimum relative dry density of 95%, determined by California Impact Test Method No. 216.
- D. All backfilling shall be brought flush with finished subgrade.
- E. Excess material shall be removed from the site. Trenches shall be backfilled immediately after approval.

3.10 Installation Of Piping, Ductwork And Equipment

- A. The installation of piping, ductwork, and equipment shall be made in such a manner to clear beams and obstructions. Do not cut into or reduce the size of plates or any load

carrying members without approval of the Architect. Check Drawings and Work of others to prevent interference. Deviations of the Work determined by the Architect shall be installed by the Contractor without additional cost.

- B. Install piping and ductwork promptly, cap or plug open ends of pipe. No piping shall be permanently covered by construction before inspection and approval. Piping and ductwork shall be installed in accordance with best practice and recommendations of the manufacturer.
- C. Conceal piping and ductwork unless indicated otherwise. Inspect each piece of pipe, tubing, fittings, and equipment for defects and obstructions. Remove defective material from site. Install piping generally level, free of traps and unnecessary bends to conform with building requirements, and provide space for other work. Piping to be free of unusual noises. Avoid any possible galvanic action by isolating dissimilar metals with suitable Dielectric Insulating Fittings.
- D. Unless called for otherwise, hereinafter in this Specification or by specific detail on the Drawings, all water pipes in contact with structure and/or hangers shall be suitably isolated. In the case of uninsulated pipe, "Trisolators" or equal shall be used.
- E. Protect enameled or polished equipment from damage, tool marks, etc.

3.11 Sterilization Of Pipes

- A. After preliminary purging of the Systems, the entire domestic potable water system pertaining to Work under this Contract shall be chlorinated in accordance with American Water Works Association, State of California Health and Safety Code procedure for disinfecting water mains. A thorough flushing operation shall be run upon completion of sterilization. Contractor shall then arrange with local health authority for test on mains and water systems and provide three (3) copies of test results to the Architect.

3.12 Equipment Identification Tags

- A. Major pieces of equipment shall include, but are not limited to: water heaters, air conditioners, unit heaters, supply and exhaust fans, and shall be tagged.
 - 1. Tags shall be 2" x 2" x 1/8" thick Formica/plastic engraving stock beveled on both sides and with two 3/16" diameter holes near the top uppermost tag corners.
 - 2. Tags shall be white with 3/8" high red engraved letters.
 - 3. Tags shall be attached to the equipment with bolts, screws or chains as per valves.
 - 4. Tags shall have the following information:
 - 5. Equipment number and nomenclature corresponding to the information on the mechanical contract drawings.
 - 6. Examples:

WH	EF	AC
1	2	3

3.13 Identification Of Piping Systems

- A. Building Systems:

1. Piping systems installed anywhere within the scope of the Work shall be identified as to contents using a color banding and marking system as outlined and in compliance with Federal OSHA requirements.
2. This Work includes furnishing and application of all snap-around and/or self-sticking pipe markers. Formica valve tags, chains, wires, and related materials proper for the completion of the Work.
3. Pipe markers shall be permanently shaped vinylite plastic snap-around pipe markers as manufactured by Seton Nameplate Corporation, Wilmington Plastic Company, or approved equal.
4. A maximum of four basic background colors shall be used and they shall conform to the American Standards Association Standard A13.1, "Scheme For Identification of Piping Systems" The names of materials (pipe contents) shall be superimposed on these ANSI background colors. Work legends shall conform to ANSI A13.1 to avoid confusion and mistakes. Basic background colors and content classification are:

Yellow	Dangerous Materials
Red	Fire Protection
Bright Blue	Protective Materials
Green	Safe Materials

5. Pipe marking and installation shall be as follows:
6. Apply "Plastic Pipe Marker" at each valve to show proper identification of pipe contents.
7. Use an "Arrow Marker" with each "Pipe Content Marker". The Arrow shall always point away from the "Pipe Marker" and in the direction of the flow.
8. If flow can be in both directions, use a double-header "Arrow Marker".
9. Apply "Pipe Marker" and "Arrow Marker" at every point of pipe entry and exit where the line goes through the wall, floor or roof.
10. Apply "Pipe Marker" and "Arrow Marker" on each riser and "T" joint.
11. Apply "Pipe Marker" and "Arrow Marker" every 50 feet on long continuous lines.
12. Identifying long continuous lines with "Pipe Marker and "Arrow Marker at every bay or aisle within the building. All branch runs from mains on the roof shall be identified with "Pipe Marker" and "Arrow Marker" at the point of takeoff.
13. Apply "Markers" on the two lower quarters of the pipe where view is unobstructed. In this position "Markers" are read at a glance from ground floor level and dust will not obscure the "Marker". Roof-mounted piping "Markers" shall be so located that they can be read from a standing position on the roof.
14. All identification markers located out of doors and exposed to the sun and the elements shall receive one coat of clear lacquer after application to the pipe, to seal edges and to act as a protective coating.
15. Each "Arrow Marker" must have the same ANSI background color as its companion "Pipe Marker". Arrow must point away from "Pipe Marker" and indicate direction of flow.
16. "Pipe Markers" shall be guaranteed to stay on pipe systems for a period of not less than five years.
17. Following is a list of, but not necessarily limited to, the more commonly used piping systems that require identification "Pipe Markers" and "Arrow Markers".

Abbreviations on Drawings	Wording to Put on Pipe Marker	ANSI Color Background
CHWS	Chilled Water Supply	Green
CHWR	Chilled Water Return	Green
HWS	Hot Water Supply	Yellow
HWR	Hot Water Return	Yellow
CW	Domestic Cold Water	Green
DI	Deionized Water	Green
DHWS	Domestic Hot Water Supply	Yellow
DHWR	Domestic Hot Water Return	Yellow
S	Gravity Sewer or Drain	Green
V	Vent	Green
G	Natural Gas	Yellow
A	Compressed Air	Blue
FM	Fire Protection Water	Red
ST	Steam	Yellow
CD	Condensate Drain Return	Yellow
VAC	Vacuum	Green
RL	Refrigerant Liquid	Yellow
RS	Refrigerant Suction	Yellow
All lettering shall be black on the yellow background and white on all other background.		

3.14 Seismic Bracing

- A. It shall be required that pipes, ducts and conduits be supported and braced per the SMACNA "Seismic Restraints Manual Guidelines for Mechanical Systems", 2006 Edition.
- B. When the SMACNA "Seismic Restraint Manual Guidelines for Mechanical Systems" does not specifically address the size of duct or pipe to be braced, the following shall apply:
 - 1. All ducts shall be braced and guyed to prevent lateral or horizontal swing to the satisfaction of the Architect, Engineer, and State Inspector.
 - 2. All pipes shall be braced and guyed to prevent lateral or horizontal swing to the satisfaction of the Architect, Engineer, and State Inspector. Absolutely, no "Plumber's Tape" shall be used anywhere on this project.

3.15 Operation And Instruction

- A. The Contractor shall furnish competent Technicians to supervise start-up operations of equipment specified by the Architect or Engineer and to instruct Owner's operators. The Contractor shall furnish six complete sets of operating instructions and service manuals to the Architect.

- B. Instruction period shall be started after instruction books and service manuals have been submitted to and approved by the Architect and shall be at hours (regular and non-regular) arranged by the Architect.
- C. Service manuals shall include oiling, cleaning, and servicing data, compiled in clearly and easily understood form and in a durable binder. Data shall show all serial numbers of every piece of equipment and complete list of replacement parts.

3.16 Warranty

- A. The contractor shall warranty all of the systems for proper operation installed by the contractor for not less than one calendar year from date of project completion. This completion date shall be set by the Architect or Owner.

END OF SECTION

SECTION 25 0500
COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section Includes:
 - 1. Materials and equipment shall be furnished and installed in support of electrical work described in these plans and specifications including but not limited to, raceways, boxes, enclosures, feeders, branch circuiting, supports, terminal cabinets, sleeves, gutters, panels, transformers, switchgear, lighting fixtures, controls, relays, contactors, in order to complete and make fully functional the systems described.
 - 2. Complete fire alarm and annunciation system as shown and/or required by the (local jurisdiction having authority, California State Fire Marshal) including monitoring equipment and wiring for central station connection. Provide fire alarm system design and submit for approval by the AHJ.
 - 3. Lighting systems, both interior and exterior as shown on the plans and as specified herein, including controls, occupancy sensors, lumen sensors, photocell controls, lamps, dimmers, racks, dimming ballasts, supports, fasteners, straps, and miscellaneous mounting hardware and support structures for such equipment.
 - 4. Electrical, Telephone and CATV Utility company site work as required by the serving companies. All utility company conduits, raceways, trenching, backfilling, utility vaults, equipment pads and substructures shall meet both the respective utility companies requirements as well as those of the authority having jurisdiction, whichever is more restrictive. In no case shall work be completed and covered without the written approval of the serving utility companies both on and off site.
 - 5. Duct banks and raceways for all power and communications systems as shown and/or required. Duct banks shall include all trenching, racking, conduit, concrete, backfill, boxes, pads, substructures required for a fully developed and useable pathway for cables, conductors, as shown on site, etc.
 - 6. HVAC and plumbing electrical: Conduit, conductors and terminations for all line voltage power, line voltage controls and fusible and/or non-fusible safety disconnect switches for HVAC equipment, including but not limited to air conditioners, furnaces, fans, heat pumps, cooling towers, system pumps, condensing units. Provide protective equipment unless otherwise noted, etc. including protective devices.
 - 7. Plumbing Electrical: Conduit, conductors and terminations for plumbing equipment with power requirements including necessary fusible and/or non-fusible safety disconnect devices. Provide motor starters where required unless provided by mechanical specification.
 - 8. Power and Lighting Distribution: Furnish and install power and lighting distribution systems including but not limited to panels, feeders, transformers, branch circuits,

- devices, fixtures, disconnect switches, contactors, controls, etc. for a complete working system.
9. Data systems infrastructure including all boxes, raceways, cable tray, wire basket tray, dedicated branch circuits, sleeves and penetrations, etc. as described and as shown in plans, risers, specifications, EIA/TIA standards and/or required for a complete and operating system.
 10. Voice amplification system in multi-purpose rooms, auditoria and gymnasiums, including amplifiers, racks, mixers, microphones, outlets, cable/connections, equipment racks, etc. as specified on the drawings and in written specifications.
 11. Lighting acceptance testing, documentation and completion of required forms as specified in Section 26 5670, LIGHTING ACCEPTANCE TESTING.
 12. Furnish optional standby power distribution system in accordance with all applicable codes and standards. This project shall include the (standby option/prime) generator, automatic transfer equipment and emergency distribution system. This shall include the furnishing of a system that is approved by the local Air Pollution Control District (APCD) and the furnishing of all required data to the Owner or Owner Representative for obtaining the necessary permits.
 13. Allocation of time to adequately train the Owner on the use and operation of all systems installed within the facility or on the property. Minimum two week advance notice shall be coordinated with the Owner and his representatives. Training shall be as outlined in individual system specifications identified to follow.
- B. Related Sections Under Other Divisions:
1. Mechanical Wiring: Control circuit wiring, energy management controls and interlocks for mechanical equipment shall be installed by Mechanical Contractor.
 2. Painting of electrical equipment where exposed and required by the Architect to be painted as described elsewhere in the specification.
 3. Irrigation System: Provide all line voltage (50 volts or above) connections to irrigation system equipment, time clocks and or powered satellite controls. Coordinate locations of this work with the Landscape Contractor.
 4. Pole Bases: Contractor shall be responsible to furnish light standard concrete pole bases, rebar, bolt templates and anchor bolt kits for a complete installation. Concrete, rebar, excavation shall be by Contractor in accordance with all parts of this specification.
 5. HVAC Control Raceway: Raceways, boxes, and control wiring for thermostats, temperature sensors and control components specified within the mechanical specifications, shall be furnished and installed as required by Division 25 and installed in accordance with the minimum wiring methods allowed for branch circuit wiring in Division 26 (the DDC systems/EMS systems and components are installed in accordance with Division 25).
 6. Smoke Fire Dampers: Coordination with Mechanical plans for exact locations and points of connection for power and fire alarm system connections (power and fire alarm connection shall be by Electrical Contractor).
 7. Duct mounted smoke detectors: Coordination with Mechanical plans for exact locations and points of connection for power and fire alarm system connections (power and fire alarm connection shall be by Electrical Contractor).
 8. Security System: Shall be installed by Owner's vendor. Contractor shall provide conduits, boxes, stubs to accessible ceilings, dedicated circuit(s) for alarm panel, access control system (key pads, electric locks), etc. as shown and/or required by the Owner's vendor.

1.03 SYSTEM DESCRIPTION

- A. The electrical plans indicate the general layout and arrangement; the architectural drawings and field conditions shall determine exact locations. Field verify all conditions and modify as required to satisfy design requirements as well as code minimums. Maintain all required working clearances as described in CEC Article 110 as well as other applicable articles.
- B. Discrepancies shall be brought immediately to the attention of the Architect for clarification. The Architect shall approve any changes. Prior to rough-in, refer to architectural plans that shall take precedence over electrical plans with respect to locations.
- C. Verify all power and communications utility company requirements prior to commencement of utility work. Make proper adjustments to the construction to satisfy the serving utility requirements if they differ from the construction documents. It shall be the Contractor's responsibility to contact each utility company for obtaining finalized utility design drawings and/or approval, and for scheduling inspection of utility infrastructure installations.
- D. Charges imposed by the electric and communications utility companies shall be paid by Owner directly to utility companies.

1.04 SUBMITTALS AND SHOP DRAWINGS

- A. Before construction, submit in accordance with the General Conditions of this Specification: A complete list of all materials proposed to be furnished and installed under this section.
- B. Manufacturers' specifications, catalog cuts and shop drawings as required to demonstrate compliance with the specifications. Identify specific intended use for each component where submittal may be ambiguous. Submit entire bound submittal at one time; partial submittals will not be accepted. At a minimum, submittals will be required for the following:
 - 1. Utility service/site work equipment including ducts, conduits, fittings, concrete manholes, concrete and fiberglass pull, manhole, boxes, vaults, trench racks, accessories, etc.
 - 2. Distribution equipment including main switchboards, distribution switchgear, transformers, distribution panels and breakers, motor controls, distribution and branch circuit panels, grounding, transient voltage surge suppressors, etc.
 - 3. Electrical equipment including disconnects, fuses, raceways, straps and racks, fittings, conductors, boxes, gutters, devices, plates, etc.
 - 4. Lighting equipment including fixtures, ballasts, lamps, mounting accessories, color charts (where required), etc.
 - 5. Lighting control equipment including low voltage switching system, dimmer switchbank / accessories, occupancy sensing equipment, time clocks, contactors, photocells, lumen sensors, etc.
 - 6. Constructability review letter/comments for lighting acceptance testing as required by Section 26 5670, LIGHTING ACCEPTANCE TESTING.
 - 7. Complete system component submittals and shop drawings for:
 - a. Fire Alarm System
 - b. Generator and Transfer Switches.
 - c. Communication Systems including but not limited to; cable, fiber, terminations, cable management, cable tray, patch panels, equipment racks, specified active

- electronics (where called for), cabinets, jacks, plates, cable labeling, testing procedure.
 - 8. Conduit including all fittings, etc.
 - 9. Wiring and cable, terminations, etc.
 - 10. Fire rating penetration materials, details, etc.
- C. The intent of these specifications is to establish a standard of quality for materials and equipment. Therefore, some items are identified by manufacturer or trade name designation. Substitutions shall be subject to the Architect's approval. Samples of the proposed and substitute materials may be required for inspection prior to approval. Costs, if any, for evaluation of substitutions shall be the Contractor's responsibility. The decision of the Architect shall be final. Where the substitution will affect other trades, coordinate all changes with those trades concerned and pay any additional costs incurred by them as a result of this substitution. Approval of substitutions shall not relieve the Contractor from providing an operational system in accordance with all applicable codes and ordinances.
- D. SUPPORTING DEVICES
- 1. Provide all details of suspension and support for ceiling hung equipment.
 - 2. Where walls, floor, slabs or supplementary steel work are used for seismic restraint locations, details of acceptable attachment methods for ducts, conduit and pipe must be included and approved before the submittals must include spacing, static loads and seismic loads at all attachment and support points.
 - 3. Provide seismic details of seismic restraints and anchors; including number, size and locations for each piece of equipment.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Storage of equipment for the job is the responsibility of the Electrical Contractor and shall be scheduled for delivery to the site, as the equipment is required. Damage to the equipment delivered to the site or in transport to the job shall be the responsibility of the Electrical Contractor.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Materials shall be new and bear the label of or be listed by a nationally recognized testing laboratory. The quality and suitability of all materials shall conform to the standards and practices of this trade.
- B. Supplied materials shall be of a current manufactured product line. Discontinued products are not acceptable. Where products are identified on the contract documents by part number, supply the current product model or series which meets the specification and intended use of the specified component.

2.02 SUPPORTING DEVICES

- A. Hangers: Kindorf B-905-2A Channel, H-119-D washer, C105 strap, 3/8" rod with ceiling flange.
- B. Concrete Inserts: Kindorf D-255, cast in concrete for support fasteners for loads up to 800 lbs.
- C. Pipe Straps: Two-hole galvanized or malleable iron.
- D. Luminaire Chain: Campbell Chain 75031, 90-lb. test with steel hooks.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Professionalism and appearance of installations shall be in accordance with accepted practices of this trade. Installation methods shall conform to manufacturers' specifications and recommendations. The Contractor shall man the job with qualified journeymen and helpers in this trade for the duration of the job. It is the Contractor's responsibility to communicate with and keep the job superintendent apprised of changes or clarifications, etc.
- B. Employment of any person on any job in the capacity of an electrician is not permitted unless such person has qualified for and holds a valid Journeyman Electrician Pocket Card or General Journeyman Electrician Certificate issued by the State of California Division of Apprenticeship Standards except, Contractor may employ electrical helpers or apprentices on any job of electrical construction, new or existing, when the work of such helpers or apprentices is performed under the direct and constant personal supervision of a journeyman electrician holding a valid Pocket Card accepted by the State of California Division of Apprenticeship Standards.
 - 1. Each Pocket Card carrying journeyman electrician will be permitted to be responsible for the quality of workmanship for a maximum of one helper or apprentice during any same time period, provided the nature of work is such that good supervision can be maintained and the quality of workmanship is the best, as expected by Owner and implied by the latest edition of the National Electrical Code.
 - 2. Before each journeyman electrician commences work, deliver to Owner at the project site, a photocopy of the journeyman's valid Pocket Card.
- C. Materials shall be installed in accordance with the manufacturers' specification and recommendations. They must conform to the approval AHJ adopted codes and standards, but not less than the 2016 CEC and all applicable codes and standards, including but not necessarily limited to California Code of Regulations Title 24, NFPA, National Electrical Manufacturers Association, ANSI, CBC, and any other adopted ordinances of applicable agencies having jurisdiction. Refer to general conditions of specifications.
- D. Electrical Contractor shall lay work out in advance in order to avoid unnecessary cutting, chasing, and drilling of floors, walls, ceilings and other surfaces. Work of this nature shall be carefully done so as not to damage work already performed by other trades. Any damage which results must be properly repaired at no extra cost to the Owner. Such alterations shall not

depreciate the integrity of the structure. Approval for cuts or penetrations in structural members shall be by the Architect.

E. Supporting Devices:

1. Verify mounting height of all luminaires or items prior to installation when heights are not detailed.
2. Install vertical support members for equipment and luminaires, straight and parallel to building walls. Provide independent supports to structural member for electrical luminaires, materials, or equipment installed in or on ceiling, walls or in void spaces or over furred or suspended ceilings.
3. Do not use other trade's fastening devices as supporting means for electrical equipment, materials or luminaires. Do not use supports or fastening devices to support other than one particular item.
4. Support conduits within 18" of outlets, boxes, panels, cabinets and deflections. Maximum distance between supports not to exceed 8' spacing.
5. Securely suspend all junction boxes, pull boxes or other conduit terminating housings located above suspended ceiling from the floor above or roof structure to prevent sagging and swaying.
6. Provide seismic bracing per UBC requirements for this building location.
7. Supporting Devices: Safety factor of 4 required for every fastening device or support for electrical equipment installed. Support to withstand four times weight of equipment it supports. Bracing to comply with seismic design category "SDC" per Structural Engineer.

F. Coordinate work with other trades as required to eliminate any delays during construction. Coordinate changes with other prime contractors to avoid construction conflicts.

G. Engineer's Field Observation: Site visits during construction for field observations and reports will be conducted by electrical engineer when directed by the Architect. A list of items that need to be addressed will be submitted to the Architect for forwarding to the Contractor. A written response to all items shall be submitted for Owner's review once complete. When Electrical Engineering representative performs a field observation, the Electrical Contractor shall be present and available to remove equipment covers as needed.

H. Drawings of Record: Provide a full and accurate set of field record drawings marked up in a neat and understandable manner submitted to the Owner Representative, Construction Manager, or Architect upon completion of the work and prior to issuance of a certificate of completion. The drawings shall dimension all electrical facilities including but not limited to underground conduit, vaults, boxes as well as conduit routing scaled to within 12" of actual field conditions and shall be kept up to date on a daily basis reflecting changes or deviations. Electrical facilities shall be accurately drawn on the plan to scale. Refer to the general conditions of these specifications for additional requirements. Record drawings shall be required to identify both horizontal and vertical dimensions to visible and fixed points such as concrete, asphalt, buildings, sidewalks, etc.

I. Identification: Provide engraved laminated plastic nameplates for all switchboards, panelboards, fire alarm terminal cabinets, telephone and cable television backboards, main devices, control panels, time clocks, contactors and safety disconnect switches accurately identifying each device. Labels shall be attached to the equipment by means of screws or rivets. Self-adhering

labels will not be acceptable. Refer to Section 26 0553, IDENTIFICATION OF ELECTRICAL SYSTEMS.

- J. Safety: The Electrical Contractor is responsible to maintain equipment in a safe and responsible manner. Keep dead front equipment in place while equipment is energized. Conduct construction operations in a safe manner for employees as well as other work persons or anyone visiting the job site. Provide barriers, trench plates, flags, tape, etc. The Contractor shall hold all parties harmless of negligent safety practices that may cause injury to others on or near the job site.
- K. Guarantees: Equipment and labor shall be guaranteed and warranted free of defects, unless otherwise stated to be more restrictive, for a period of one year from the date of final acceptance by the Owner. A written warranty shall be presented to the Architect at the time of completion prior to final acceptance. Equipment deemed to be damaged, broken or failed should be repaired or replaced at no additional cost to the Owner. Materials or system requiring longer than a one-year warranty as described herein shall be separately warranted in separate letters of guarantee stating the duration of warranty.
- L. Operating and Installation Manuals: Provide two copies each of manuals, operating and installation instructions for equipment indicated in submittal packages. Instruct the Owner's representative as to the operation and location of equipment necessary to allow them to operate the facility upon final acceptance. This instruction period shall be prearranged with the Owner's representative prior to occupancy of the facility and the weeks prior to training scheduled.
- M. Lighting Acceptance Testing: Provide two copies of lighting acceptance testing results and equipment operating manuals as specified in Section 26 5670, LIGHTING ACCEPTANCE TESTING. Instruct the Owner on operation of control systems.

END OF SECTION

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SECTION 26 0519

LOW VOLTAGE ELECTRICAL POWER FOR CABLES AND CONDUCTORS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Wires and cables.
 - 2. Connectors.
 - 3. Lugs and pads.
 - 4. MC cable.
 - 5. SO cable.

1.03 SYSTEM DESCRIPTION

- A. Provide wires, cables, connectors, lugs, strain reliefs, racking insulators for a complete and operational electrical system.

1.04 SUBMITTALS

- A. Provide product data for the following equipment:
 - 1. Wires.
 - 2. Cables.
 - 3. Connectors.
 - 4. Lugs.
 - 5. Splice Kits.
 - 6. Strain Relief Fittings.
 - 7. Cable Racking and Insulators.
- B. Provide the insulation cable testing report in the project closeout documentation, refer to Closeout Requirements in the General Conditions portion of this specification.

1.05 REGULATORY REQUIREMENTS

- A. Conform to requirements of the CEC, latest adopted version with amendments by local Authority Having Jurisdiction (AHJ).
- B. Furnish products listed by UL or other testing firm acceptable to AHJ.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Wires and Cables: General Cable, Okonite, Southwire, or approved equal.
- B. Connectors: Burndy, IlSCO, Thomas & Betts, or approved equal.
- C. Wire connectors shall be minimum 75 degree centigrade rated and properly sized for the number of conductors being connected, terminated, spliced etc. All above grade connectors shall be solderless lug or plastic wire nut type, screw on, pressure cable type (wire nut or spring nut type), 600 volt, 105 degree C, with skirt to cover all portions of stripped wires. Connector shall be U.L. rated for number and size of conductors being joined together as a splice.
- D. Splices:
 - 1. Branch Circuit Splices: Ideal, Scotch-Lock, 3M, or approved.
 - 2. Feeder Splices: Compression barrel splice with two layers Scotch 23 and four layers of Scotch 33+ as vapor barrier.
 - 3. Screw Terminal Lugs.
 - 4. Kearney Split Bolt.
- E. MC and HFC Cable: Alfalex, AFC, or approved and shall meet all CEC Article 334 provisions.

2.02 WIRES AND CABLES FOR LINE VOLTAGE SYSTEM AND CONTROLS. WIRE AND CABLE SHALL BE:

- A. Copper, 600 volt rated throughout. Conductors 14AWG to 10AWG, solid or stranded. Conductors 8AWG and larger, stranded.
- B. Phase color to be consistent at all feeder terminations; A-B-C, top to bottom, left to right, front to back. Phasing tape shall be permitted on sizes #6 and larger.
- C. Color Code Conductors as Follows:

PHASE	208 VOLT
A	Black
B.	Red
C.	Blue
Neutral	White
Ground	Green

- D. All conductors shall be copper unless otherwise noted. Minimum size for individual conductors shall be #12 AWG unless otherwise noted. Sizes #8 AWG and larger shall be stranded conductor. Individual conductors shall be insulated with type, XHHW, THW, THHN/THWN 600-volt insulation unless otherwise noted. Control, signal, communication conductors shall be as dictated by the vendor of that equipment or as specified here-in. Proper insulation type shall be used for the proper environmental application (i.e., waterproof, wet location, plenum, temperature rated). If a condition exists where the application is uncertain, contact the Engineer

for direction. Contractor is responsible to follow specific cabling requirements described in other sections of this specification relative to various communications and controls systems as well as the respective riser diagrams shown on plans. If a discrepancy occurs, communicate such discrepancy to the Architect and Engineer immediately for resolution.

- E. Insulation types THWN, THHN or XHHW. Minimum insulation rating of 90C for branch circuits.
- F. MC Cable: High strength galvanized steel or aluminum flexible armor. Full length minimum size No. 12 copper ground wire, THHN 90C conductors, full length tape marker. Overall PVC or nylon cable tape. Short circuit throat insulators, mechanical compression termination. Manufacturers: Alfex, AFC.
- G. SO Cable: Annealed copper conductors, 600 volt rated. Minimum Size No. 12, with ground wire. Maximum of six conductors and ground per cable. 90C rated thermoset jacket. Manufacturers: Tiger Brand.
- H. Refer to signal and communications specification sections for cable requirements.

2.03 CONNECTORS

- A. Copper Pads: Drilled and tapped for multiple conductor terminals.
- B. Lugs: Indent/compression type for use with stranded branch circuit or control conductors.
- C. Solid Conductor Branch Circuits: Spring connectors, wire nuts, for conductors 18 through 8AWG.

2.04 LUGS AND PADS

- A. Ampacity: Cross-sectional area of pad for multiple conductor terminations to match ampere rating of panelboard bus or equipment line terminals.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Installation: Conductors shall not be installed until after conduit systems are permanently in place. Use an approved non hardening type wire pulling lubricant if lubricant is to be used. Maintain all conduits and wire pulls free from foreign material. If due to field conditions, more than a total of 300 degrees of bend are required; a pull box shall be furnished and installed for ease of installation. Said pull boxes must be sized and rated for the appropriate application and must remain easily accessible upon completion of the project (approval of the location shall be obtained from the Architect prior to installation). Show these pullboxes on the field record drawings. Conductors installed in underground raceways on site shall be duct sealed and taped where they exit the raceway to prevent the entrance of foreign material and moisture after the

conductors are installed. Proper drainage shall be provided for underground pull and splice boxes.

- B. Insulation: Use proper insulation types where temperature and environment are a factor.
- C. Splices at or below grade level shall be made with wet location rated and approved mechanical connectors and shall be encapsulated in epoxy or plastic molded poured kits. The connections must be assured to be watertight. Splices at or below grade shall always be avoided and minimized. Prior approval is required for feeder splices below grade. Submit proposed materials and exhibit showing location of intended splices for Engineer's review and approval prior to commencing with the work.
- D. Labeling: All conductors in panels, switchboards, terminal cabinets, vaults, pull boxes, and junction boxes shall be labeled with tape number markers indicating circuit number and identifying system. All labeling shall be permanent. In manholes and vaults, provide embossed brass tags identifying system serviced and function. See Section 26 0553 IDENTIFICATION OF ELECTRICAL SYSTEMS.
- E. All conductors, wiring, cable where installed below floor, slab or underground shall be considered wet locations, and shall be rated accordingly. Non waterproof cabling is not allowed in any below grade or wet application.
- F. Cables routed together in cable tray shall be stacked, organized and tie wrapped together in a neat and workman like manner. Random cable routing is not acceptable.
- G. Cable and conductors routed through pull boxes and vaults shall be properly supported on porcelain or equal insulators mounted on steel rack inserts. Bend radius of cable or conductor shall not be less than six times the overall cable diameter.
- H. Wires and Cables:
 - 1. Conductor Installation:
 - a. Install conductors in raceways having adequate, code size cross-sectional area for wires indicated.
 - b. Install conductors with care to avoid damage to insulation.
 - c. Do not apply greater tension on conductors than recommended by manufacturer during installation.
 - d. Use of pulling compounds is permitted. Clean residue from exposed conductors and raceway entrances after conductor installation.
 - 2. Conductor Size and Quantity:
 - a. Install no conductors smaller than 12AWG unless otherwise shown.
 - b. Provide all required conductors for a fully operable system.
 - 3. Provide dedicated neutrals (one neutral conductor for each phase conductor) in the following single phase circuits:
 - a. Dimmer controlled circuits.
 - b. Ground fault and arc fault protected circuits where a GFI and arc fault breakers are used in panelboards.
 - c. Other electronic equipment which produces a high level of harmonic distortion including but not limited to computers, printers, plotters, copy machines, fax machines, where indicated.

4. MC Cable shall be allowed for lighting branch circuiting in non-exposed but accessible ceiling areas. Ceilings that are not accessible by definition shall not allow MC cable use. Power feeders, and electrical branch circuit wiring shall utilize raceways as specified and allowed by Section 26 0533, RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS.
5. Conductors in Cabinets:
 - a. Cable and train all wires in panels and cabinets for power and control neatly and uniformly. Use plastic ties in panels and cabinets.
 - b. Tie and bundle feeder conductors in wireways of panelboards.
 - c. Hold conductors away from sharp metal edges.
 - d. Connectors: Retighten mechanical type lugs and connectors for conductors to equipment prior to Notice of Completion.

3.02 FIELD QUALITY CONTROL

- A. Tests:
 1. Test conductor insulation on feeders of 400 amp and greater for conformity with 1000 volt megohmmeter. Use Insulated Cable Engineers Association testing procedures. Minimum insulation resistance acceptable is 1 megohm for systems 600 volts and below.
 2. Test Report: Prepare a typed tabular report indicating the testing instrument, the feeder tested, amperage rating of the feeder, insulation type, voltage, the approximate length of the feeder, conduit type, and the measured resistance of the megohmmeter test. Submit report with operating and maintenance manual.

END OF SECTION

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SECTION 26 0526
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section Includes:
 - 1. Grounding and bonding requirements of electrical installations for personnel safety and to provide a low impedance path for possible ground fault currents as described in CEC Article 250.
 - 2. "Grounding electrode system" refers to all electrodes required by CEC, as well as including made, supplementary, lightning protection system and telecommunications system grounding electrodes.
 - 3. The terms "connect" and "bond" are used interchangeably in this specification and have the same meaning.
- B. Related Work:
 - 1. Section 26 0500, COMMON WORK RESULTS FOR ELECTRICAL.
 - 2. Section 26 0519, LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES.

PART 2 - PRODUCTS

2.01 GROUNDING AND BONDING CONDUCTORS

- A. Equipment grounding conductors shall be UL 83 insulated stranded copper, except that sizes No. 10 AWG and smaller shall be solid copper. Insulation color shall be continuous green for all equipment grounding conductors, except that wire sizes No. 4 AWG and larger shall be permitted to be identified per CEC.
- B. Bonding conductors shall be ASTM B8 bare stranded copper, except that sizes No. 10 AWG and smaller shall be ASTM B1 solid bare copper wire.
- C. Conductor sizes shall not be less than what is shown on the drawings and not less than required by the CEC, whichever is greater.

2.02 GROUND RODS

- A. Copperclad steel, 5/8" diameter by 8' long, conforming to UL 467 unless otherwise noted on drawings and details.
- B. Quantity of rods shall be as required to obtain the specified ground resistance or additional rods shall be driven to obtain specified resistance or less.

2.03 SPLICES AND TERMINATION COMPONENTS

- A. Components shall meet or exceed UL 467 and be clearly marked with the manufacturer, catalog number, and permitted conductor size(s).

PART 3 - EXECUTION

3.01 GENERAL

- A. Ground in accordance with the CEC, as shown on drawings, and as hereinafter specified.
- B. System Grounding:
 - 1. Secondary service neutrals: Ground at the supply side of the secondary disconnecting means and at the related transformers.
 - 2. Separately derived systems (transformers downstream from the service entrance): Ground the secondary neutral.
- C. Equipment Grounding: Metallic structures (including ductwork and building steel), enclosures, fire sprinklers, plumbing piping, raceways, junction boxes, outlet boxes, cabinets, machine frames, and other conductive items in close proximity with electrical circuits shall be bonded and grounded.

3.02 INACCESSIBLE GROUNDING CONNECTIONS

- A. Make grounding connections which are buried or otherwise normally inaccessible (except connections for which periodic testing access is required) by exothermic weld.

3.03 SECONDARY EQUIPMENT AND CIRCUITS

- A. Main Bonding Jumper: Bond the secondary service neutral to the ground bus in the service equipment.
- B. Metallic Piping, Building Steel, and Supplemental Electrode(s):
 - 1. Provide a grounding electrode conductor sized per CEC between the service equipment ground bus and all metallic water and gas pipe systems, building steel, and supplemental or made electrodes. Jumper insulating joints in the metallic piping. All connections to electrodes shall be made with fittings that conform to UL 467.
 - 2. Provide a supplemental ground electrode and bond to the grounding electrode system.

- C. Service Disconnect: Provide a ground bar bolted to the enclosure with lugs for connecting the various grounding conductors.
- D. Switchgear:
 - 1. Connect the various feeder equipment grounding conductors to the ground bus in the enclosure with suitable pressure connectors.
 - 2. For service entrance equipment, connect the grounding electrode conductor to the ground bus.
 - 3. Connect metallic conduits, which terminate without mechanical connection to the housing, by grounding bushings and grounding conductor to the equipment ground bus.
- E. Conduit Systems:
 - 1. Ground all metallic conduit systems. All metallic conduit systems shall contain an equipment grounding conductor sized per CEC.
 - 2. Non-metallic conduit systems shall contain an equipment grounding conductor, except that non-metallic feeder conduits which carry a grounded conductor from exterior transformers to interior or building-mounted service entrance equipment need not contain an equipment grounding conductor.
 - 3. Metal conduit containing only a grounding conductor, and which is provided for mechanical protection of the conductor, shall be bonded to that conductor at the entrance and exit from the conduit.
- F. Feeders and Branch Circuits: Install equipment grounding conductors with all feeders, power and lighting branch circuits.
- G. Boxes, Cabinets, Enclosures, and Panelboards:
 - 1. Bond the equipment grounding conductor to each pullbox, junction box, outlet box, device box, cabinets, and other enclosures through which the conductor passes.
 - 2. Provide lugs in each box and enclosure for equipment grounding conductor termination.
 - 3. Provide ground bars in panelboards, bolted to the housing, with sufficient lugs to terminate the equipment grounding conductors.
- H. Motors and Starters: Provide lugs in motor terminal box and starter housing or motor control center compartment to terminate equipment grounding conductors.
- I. Receptacles shall not be grounded through their mounting screws. Ground with a jumper from the receptacle green ground terminal to the device box ground screw and the branch circuit equipment grounding conductor.
- J. Ground lighting fixtures to the equipment grounding conductor of the wiring system when the green ground is provided; otherwise, ground the fixtures through the conduit systems. Fixtures connected with flexible conduit shall have a green ground wire included with the power wires from the fixture through the flexible conduit to the first outlet box.
- K. Fixed electrical appliances and equipment shall be provided with a ground lug for termination of the equipment grounding conductor.
- L. Raised Floors: Provide bonding of all raised floor components.

- M. Panelboard Bonding: The equipment grounding terminal buses of the normal and emergency branch circuit panelboards shall be bonded together with an insulated continuous copper conductor not less than No. 8 AWG where panels are in same room together or within 25' of each other. These conductors shall be installed in rigid metal conduit.

3.04 CONDUCTIVE PIPING

- A. Bond all conductive piping systems, interior and exterior, to the building to the grounding electrode system. Bonding connections shall be made as close as practical to the equipment ground bus.

3.05 TELECOMMUNICATIONS SYSTEM

- A. Bond telecommunications system grounding equipment to the electrical grounding electrode system. Refer to Section 27 1300, INTERCOMMUNICATIONS SYSTEMS.

3.06 GROUND RESISTANCE

- A. Grounding system resistance to ground shall not exceed 25 ohms. Make necessary modifications or additions to the grounding electrode system for compliance without additional cost to the Owner. Final tests shall assure that this requirement is met and test results shall be submitted to the Owner with final close out documents.
- B. Resistance of the grounding electrode system shall be measured using a four-terminal fall-of-potential method as defined in IEEE Standard 81. Ground resistance measurements shall be made before the electrical distribution system is energized and shall be made in normally dry conditions not less than 48 hours after the last rainfall. Resistance measurements of separate grounding electrode systems shall be made before the systems are bonded together below grade. The combined resistance of separate systems may be used to meet the required resistance, but the specified number of electrodes must still be provided.
- C. Services at Pacific Gas and Electric Company interface point shall comply with their ground resistance requirements.
- D. Below-grade connections shall be visually inspected by the IOR prior to backfilling. The Contractor shall notify the IOR 24 hours before the connections are ready for inspection.
- E. Furnish a copy of tests to Owner at completion of project.

3.07 GROUND ROD INSTALLATION

- A. Drive each rod vertically in the earth, not less than 7 1/2' in depth.
- B. Where permanently concealed ground connections are required, make the connections by the exothermic process to form solid metal joints. Make accessible ground connections with mechanical pressure type ground connectors.

- C. Where rock prevents the driving of vertical ground rods, install angled ground rods or grounding electrodes in horizontal trenches to achieve the specified resistance.

END OF SECTION

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SECTION 26 0529
HANGER AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes the following:
 - 1. Hangers and supports for electrical equipment and systems.
 - 2. Construction requirements for concrete bases.
- B. Related Sections include the following:
 - 1. Section 26 0548 "Vibration and Seismic Controls for Electrical Systems" for products and installation requirements necessary for compliance with seismic criteria.

1.03 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. IMC: Intermediate metal conduit.
- C. RMC: Rigid metal conduit.

1.04 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.05 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Steel slotted support systems.
 - 2. Nonmetallic slotted support systems.
- B. Shop Drawings: Show fabrication and installation details and include calculations for the following:
 - 1. Trapeze hangers. Include Product Data for components.
 - 2. Steel slotted channel systems. Include Product Data for components.
 - 3. Equipment supports.

1.06 INFORMATIONAL SUBMITTALS

- A. Welding certificates.

1.07 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Comply with NFPA 70.

1.08 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified together with concrete Specifications.
- B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Section 07 7200 "Roof Accessories."

PART 2 - PRODUCTS

2.01 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Allied Tube & Conduit.
 - b. Cooper B-Line, Inc.; a division of Cooper Industries.
 - c. ERICO International Corporation.
 - d. GS Metals Corp.
 - e. Thomas & Betts Corporation.
 - f. Unistrut; Tyco International, Ltd.

- g. Wesanco, Inc.
 2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 3. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 4. Channel Dimensions: Selected for applicable load criteria.
 - B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
 - C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
 - D. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
 - E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
 1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - 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:
 - 1) Hilti Inc.
 - 2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - 3) MKT Fastening, LLC.
 - 4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.
 2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
 - 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:
 - 1) Cooper B-Line, Inc.; a division of Cooper Industries.
 - 2) Empire Tool and Manufacturing Co., Inc.
 - 3) Hilti Inc.
 - 4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - 5) MKT Fastening, LLC.
 3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
 4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
 5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
 6. Toggle Bolts: All-steel springhead type.
 7. Hanger Rods: Threaded steel.

2.02 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Section 05 5000 "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.01 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.
- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 - 1. Secure raceways and cables to these supports with two-bolt conduit clamps.

3.02 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To Wood: Fasten with lag screws or through bolts.
 - 2. To New Concrete: Bolt to concrete inserts.
 - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - 4. To Existing Concrete: Expansion anchor fasteners.
 - 5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches (100 mm)

thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches (100 mm) thick.

6. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
7. To Light Steel: Sheet metal screws.
8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.

- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.03 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Section 05 5000 "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

3.04 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated but not less than 4 inches (100 mm) larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
- B. Use 3000-psi (20.7-MPa), 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Section 03 30 00 "Cast-in-Place Concrete."
- C. Anchor equipment to concrete base.
 1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 2. Install anchor bolts to elevations required for proper attachment to supported equipment.
 3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.05 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).

- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION

SECTION 26 0533
RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
1. Conduit and fittings.
 2. Outlet boxes.
 3. Weatherproof outlet boxes.
 4. Junction and pull boxes.
 5. Floor boxes and poke-through.
 6. Cabinets, termination cabinets.
 7. Gutters.
 8. Concrete boxes and vaults.
 9. Fiberglass or composite boxes and vaults.
- B. Related Work:
1. Installation of all wire, cable, conductor, boxes/gutters, pull ropes, fiber optic cable raceway, conduit, innerduct, cable sleeve and duct as described on the plans and/or as specified here-in. This scope shall include pathways to be installed underground on site and offsite, underslab, above grade, both concealed and exposed, overhead concealed and exposed as appropriately applied. Raceways/boxes shall be installed in accordance with their intended and allowed uses and as specified here-in whichever is more restrictive. Size and capacity of all raceway/boxes shall be as specified here-in or as depicted on the drawings, but shall not be less than that required by code. Larger raceway sizes may be specified than code would permit. The specifications shall govern.
 2. Listed products for termination, coupling, extending, benching supports of raceways shall be used.
 3. Raceways/boxes described by this section shall include, but not be limited to, power for site utilities and lighting, site and building communications, controls, fire alarm, security, access control, sound systems, data system, energy management systems, power distribution, lighting, lighting controls, video, CATV, voice communications, intercom, nurse call, HVAC and other building low voltage/communications systems controls as may be required. Raceways, boxes and duct paths required for utility companies shall be installed per plans unless utility company requirements are more restrictive at which time those requirements shall take precedence.
 4. Protection of and cleanliness of pathways and raceways must be assured during the construction process in order to eliminate the possibility of debris entering the conduit, duct, pathway resulting in decreased wire capacity and potential damage to installed conductors and cables.

5. Pathways are shown in a diagrammatic way and are generally accurate as to routing, however, it is the Contractor's responsibility as a means and methods process to coordinate with all other trades that require space within a building. The Contractor shall obtain approval for installation of raceways routing through structural footings, retaining walls, columns, beams, perkins, grade beams, etc.
6. It is the Contractor's responsibility to insure that all raceway and boxes systems penetrate fire assemblies and sound rated assemblies in an approved manner using the appropriate and listed products for the purpose.
7. Trenching and backfilling for all underground conduit systems installed by the Electrical Contractor shall be the responsibility of the Contractor. Conduits shall have minimum cover requirement of 36" below finish grade with the exception of site lighting conduits which may be 24" below finish grade minimum. More stringent depth requirements may be imposed by the local agency and utility company and shall be adhered to, and / or this specification or as detailed on the plans. Joint trenching may be utilized where practicable and where permitted by this specification. Concrete, native material and sand shall be used as backfill material and shall be compacted in accordance with and coordinated with the grading and site preparation requirements. Conduits shall rest in a minimum of 4" bed of sand prior to backfill and compaction. Locations of existing underground (UG) utility systems shall be determined by calling Underground Service Alert (USA) at least 48 hours prior to any excavation. Also refer to Section 26 0546.13, ELECTRIC UTILITY SYSTEMS.
8. Minimum conduit size shall be 3/4" except if plan shows or code requires larger size. 1' for all homerun conduits and where routed below slab or underground.
9. All electrical, control, communications systems shall be installed in metallic conduit system. This shall include but not be limited to all systems described in Section B.3 above, except for voice and data systems which shall be installed as described on these plans and as specified here-in but shall not be less than the recommendations of EIA/TIA standards.
10. All line voltage wiring within the building shall be installed in metallic conduit.
11. All conduit, concrete pads, underground concrete or fiberglass substructures shall be furnished and installed with the approved materials and type for the application. Provide proper traffic control during construction as well as barriers and protection of all excavations and trenching.
12. Empty or future conduits shall be properly plugged with plastic caps or inserts with a 3/8" polyethylene pull rope. Plastic or "duct" tape will not be acceptable.
13. Exterior installations: After conductors are installed, seal conduit ends to prevent entrance of foreign material using pliable duct seal, caps or waterproof expanding foam.
14. All low voltage systems including intercom, fire alarm, public address, etc. shall be in dedicated conduit systems. Voice / Data and Direct Digital Control (DDC) systems for HVAC cabling shall be routed as specified in Section 27 1300, INTERCOMMUNICATIONS SYSTEMS and as recommended by EIA/TIA standards. It shall be the contractor's responsibility to provide raceway down walls to outlet boxes and to provide sleeves across inaccessible ceiling spaces.
15. Underground conduits entering building shall have the open end of conduit within building above the elevation of the conduit outside the building such that water cannot enter building through conduit. If such a condition exists, a pull box outside of building footprint shall be installed in conduit route before conduit enters building whereby top of pull box is below finish floor of building and moisture may exit box before entering building.

16. No single conduit run of any type shall exceed 300 degrees of radius bend from termination box to termination box.
17. Separate Raceway System: Provide a separate dedicated raceway system for each system installed, do not combine different systems into a raceway or cable tray system, unless otherwise noted or allowed.
18. Spare, Future Conduits: Conduits labeled conduit only, spare, or for future use, shall be provided with a pullrope, capped at each end, labeled as spare with destination marked, and turned over to the Owner in an unused state. Contractor shall not utilize these conduits for the installation of cabling or conductors as part of this scope of work. Contractor to verify and install at no additional cost to the Owner, additional conduits as required for the installation of the systems being installed.
19. Outlet System: Provide electrical boxes and fittings as required for a complete installation. Including but not limited to outlet boxes, junction boxes, pull boxes, bushings, locknuts, covers and all other necessary components.
20. Code Compliance: Comply with CEC as applicable to construction and installation of electrical boxes and fittings and size boxes according to CEC 312, 314 and 366 except as noted otherwise.
21. Outlets to be flush mounted: Maintain integrity of insulation and vapor barrier. Unless otherwise noted, flush mount all outlet boxes.
22. Provide putty pads of proper type around outlet boxes and/or as detailed on plan to meet sound transmission restrictions and fire ratings of walls.

1.03 SUBMITTALS

- A. Provide Shop Drawings and Product Data for the Following Equipment:
 1. Conduit and fittings.
 2. Outlet boxes.
 3. Weatherproof outlet boxes.
 4. Junction and pull boxes.
 5. Floor boxes and poke-through.
 6. Cabinets, termination cabinets.
 7. Gutters.
 8. Concrete boxes and vaults.
 9. Fiberglass or composite boxes and vaults.
 10. Putty pads.
 11. Raceways

1.04 REGULATORY REQUIREMENTS

- A. Conform to requirements of the CEC, latest adopted version with amendments by local AHJs.
- B. Furnish products listed by UL or other independent and nationally recognized testing firm.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Extra heavy wall non-metallic conduit, shall be PVC schedule 80 manufactured in accordance with NEMA Standard TC-2, UL-651 and WC 1094A specifications.
- B. Galvanized Rigid Steel (GRS) conduit shall be hot dipped galvanized, zinc coated and shall comply with Underwriters Laboratories UL-6, ANSI Specification C-80.1 and Federal Specification WW-C-581E.
- C. Electrical Metallic Tubing (EMT) shall be zinc coated, with a protective coating applied to the inside surface and shall comply with Underwriter Laboratories UL-797 ANSI Specification C-80.3 and Federal Specification WW-C-563A.
- D. Electrical Non-Metallic Tubing (ENT), shall be listed to requirements of U.L. 1653, in accordance with CEC Article 362, and meet requirements of BI National Standard CAN/CSA-C22.2 No. 227.1-U.L. 1653. ENT shall be rated for 90 degrees C conductors and shall be recognized for use in 2-hour fire resistance non-load bearing and load bearing wall assemblies. ENT shall be recognized for through-penetration firestop systems as classified to meet U.L. and ICC building codes.
- E. Flexible Metal Conduit (FMC) shall be continuous wound reduced wall galvanized steel produced to UL standards.
- F. Liquid tight flexible metal conduit shall have a thermoplastic cover over a galvanized steel core containing an integral copper ground in sizes to 1 1/4" and shall be in compliance with UL standards and CEC Article 350.
- G. Surface mount raceway shall only be used where shown on the plans. The raceway and cover shall be colored by Wiremold but be capable of being over-painted in the field if required. The raceway and fittings shall meet all requirements of CEC Article 386 and be U.L. listed. Raceway shall be mechanically connected to structure with backing and anchor bolts.
- H. Cable runway tray shall be 12" wide with 4" side rails unless otherwise noted. It shall be U.L. listed and use listed connectors, elbows, tees, etc. Material shall be hollow steel with gray painted finish.
- I. Manufacturers:
 - 1. Outlet Boxes: Bowers, Raco, Steel City or equal.
 - 2. Weatherproof Outlet Boxes: Bell, Red Dot, [Carlon] or equal.
 - 3. Floor Boxes: Wiremold/Walker, Hubbell, Steel City, or equal.
 - 4. Junction and Pull Boxes: Circle AW, Hoffman, Wireguard or equal.
 - 5. Box Extension Adapter: Bell, Red Dot, [Carlon] or equal.
 - 6. Conduit Fittings: O-Z Gedney, Thomas & Betts, or equal.
 - 7. Vaults: Christy, Brooks, Utility Vault or equal.
 - 8. Putty pads: 3M, Hilti, or equal.
 - 9. Heavy wall rigid non-metallic conduit, Carlon, Certainteed, R&G Sloane or equal.
 - 10. Extra heavy wall non-metallic conduit, Carlon, Certainteed, R&G Sloane or equal.

11. Galvanized Rigid Steel (GRS) conduit shall be hot dipped galvanized, zinc coated and shall comply with Underwriters Laboratories UL-6, ANSI Specification C-80.1 and Federal Specification WW-C-581E.
12. Electrical Metallic Tubing (EMT) shall be zinc coated, with a protective coating applied to the inside surface and shall comply with Underwriter Laboratories UL-797 ANSI Specification C-80.3 and Federal Specification WW-C-563A.
13. Electrical Non-Metallic Tubing (ENT), shall be listed to requirements of U.L. 1653, in accordance with CEC Article 362, and meet requirements of BI National Standard CAN/CSA-C22.2 No. 227.1-U.L. 1653. ENT shall be rated for 90 degrees C conductors and shall be recognized for use in 2-hour fire resistance non-load bearing and load bearing wall assemblies. ENT shall be recognized for through-penetration firestop systems as classified to meet U.L. and ICC building codes.
14. Flexible Metal Conduit (FMC), Alfex, American Flexible Conduit or equal.
15. Liquid tight flexible metal conduit, Anacanda (type UA), Electri-flex Liquatite or equal.
16. Surface mount raceway, Wiremold, Three Compartment Series 5500 or equal
17. Wire basket tray, B-line, GS Metals, Cablofil or equal.
18. Cable runway tray, B-line, CPI, Homaco or equal.
19. Floor Boxes, Single Gang, Walker/Wiremold 880 CS Series or approved equal.
20. Floor Boxes, Multiple Gang, Walker/Wiremold RFB Series or Walker Omnibox multi-service floor box with carpet plates, and/or water resistant device covers.
21. Masonry Boxes, outlets in concrete, Raco Series 690 or equal.
22. Floor Boxes, Poke-Thru, Hubbell PT7 Series, Walker/Wiremold RC4 Series, or approved equal unless otherwise noted.
23. Floor Boxes, Poke-Thru, Furniture Feed, Walker/Wiremold RC9 Series or approved equal.
24. Exterior In-Grade Boxes for Non-Utility Company, Precast concrete or polymer concrete, Utility Vault and Christy.

2.02 OUTLET BOXES

- A. NEMA 1 gutter, junction and pull boxes shall be fabricated from code gage steel finished in grey enamel with screw cover fronts and concentric knockouts in all sides.
- B. NEMA 3R gutter, junction and pull boxes shall be fabricated from code gage galvanized steel with screw cover fronts and concentric knockouts in the bottom only. Any penetrations to the side, top or back shall be weatherproofed in an approved manner such as "MYERS" gasketed type hub or equal.
- C. Steel outlet boxes and plaster rings shall be galvanized rigid assemblies, either one piece pressed or factory welded construction containing the size and number of knockouts required. Steel outlet boxes shall be manufactured, sized and installed in accordance with CEC Article 314. Device Outlet: Installation of one or two devices at common location, minimum 4" square, minimum 1 1/2" deep. Single or 2 gang flush device plaster ring. Raco Series 681 and 686 or equal.
- D. Luminaire Outlet: minimum 4" square with correct plaster ring depth, minimum 1 1/2" deep with 3/8" luminaire stud if required. Provide proper depth plaster ring on bracket outlets and on ceiling outlets.

- E. Multiple Devices: Three or more devices at common location. Install 1 piece gang boxes with 1 piece device plastering. Install one device per gang unless otherwise allowed.
- F. Construction: Provide galvanized steel interior outlet wiring boxes, of the type, shape and size, including depth of box, to suit each respective location and installation; constructed with stamped knockouts in back and sides, and with threaded holes with screws for securing box covers or wiring devices. Boxes shall be properly secured to the structure such that they are flush with the finish surface. Boxes shall be made structurally secure by means of the proper fastening devices.
- G. Accessories: Provide outlet box accessories as required for each installation, including mounting brackets, wallboard hangers, extension rings, plaster rings, luminaire studs, cable clamps and metal straps for supporting outlet boxes, compatible with outlet boxes being used and meeting requirements of individual wiring situations.

2.03 WEATHERPROOF OUTLET BOXES

- A. Construction: Provide corrosion-resistant cast iron, with zinc finish, weatherproof outlet wiring boxes, of the type, shape and size, including depth of box, with threaded conduit ends, cast metal face plate with spring-hinged waterproof cap suitably configured for each application, including face plate gasket, blank plugs and corrosion proof fasteners. Weatherproof boxes to be constructed to have smooth sides, zinc, galvanized finish.
- B. Surface mounted die cast aluminum device boxes shall be provided with screw holes to accommodate cast device covers.
- C. Cover plates on outlet boxes mounted flush in the wall shall be gasketed to the wall in a watertight manner. Weatherproof boxes in wet locations as described in CEC 406.8 (B) shall be provided with a “while-in-use” cover; red dot ‘CK’ Series of aluminum die-cast construction, NEMA 3R, with lacquer finish.

2.04 JUNCTION AND PULL BOXES

- A. Construction: Provide galvanized sheet steel junction and pull boxes, with screw-on covers; of the type shape and size, to suit each respective location and installation; with welded seams and equipped with steel nuts, bolts, screws and washers.
- B. Location:
 - 1. Install junction boxes above accessible ceilings for drops into walls for receptacle outlets from overhead.
 - 2. Install junction boxes and pull boxes as required to facilitate the installation of conductors and limiting the accumulated angular sum of bends between boxes, cabinets and appliances to 300 degrees.
 - 3. Locations: Junction boxes shall be located only where necessary and only in equipment rooms, closets, and accessible attic and underfloor spaces. A horizontal distance of 24” shall separate outlet boxes on opposite sides of occupancy separation walls, fire-rated walls or partitions.

4. Labeling: Junction box covers shall be marked with indelible ink indicated the circuit numbers passing through the box.

2.05 BOX EXTENSION ADAPTER

- A. Construction: Diecast aluminum.
- B. Location: Install over flush wall outlet boxes to permit flexible raceway extension from flush outlet to fixed or movable equipment.

2.06 CONDUIT FITTINGS

- A. Requirements: Provide corrosion-resistant punched-steel box knockout closures, conduit locknuts and plastic conduit bushings of the type and size to suit each respective use and installation.
- B. Steel boxes may allow for field knock-out modifications, but shall in all other ways conform to code requirements.

2.07 FLOOR BOXES - MULTIPLE GANG

- A. Construction: Deep cast iron, fully adjustable before and after pour. Equal to Walker/Wiremold RFB Series or Walker Omnibox multi-service floor box with carpet plates, and/or water resistant device covers. Verify color. Partition for different power or signal applications. Provide required power receptacle devices and signal grommets or receptacles as noted. Flange type shall be compatible with floor covering for either carpet or vinyl as required and shall be brass type not polycarbonate.
- B. Floor mounted boxes shall be water tight and cast iron when installed in grade level concrete slab floor, fully adjustable with interior and exterior leveling screws. Receptacle flange shall be brass with a duplex lift lid. Flange type shall be compatible with floor type. Before installation, coordinate exact location with Architect.

2.08 FLOOR BOXES - POKE-THRU

- A. Fire rated for 4 hour, dual service, flush brass cover and service fitting prewired specification grade receptacle, voice/data jacks, as specified.
- B. Furniture Feed: Fire rated per floor assembly rating, finish flange and service head assembly.

2.09 EXTERIOR IN-GRADE BOXES FOR NON-UTILITY COMPANY USE SHALL BE:

- A. Precast concrete or polymer concrete type with full bottoms and draining into gravel drywell. Open bottom splice/pull boxes 24" x 36" and smaller shall be open bottom, with minimum 12" of gravel below for drainage.

- B. Flushmount in hardscape and 1" above grade in softscape.
- C. Provided with correct traffic type lid, i.e., full vehicular, intermediate incidental vehicular or pedestrian-rated as applicable stamped with "ELECTRIC", "LIGHTING", "COMMUNICATIONS", etc. cover identification as shown on the drawings or as applicable. All boxes or vaults located in streets, driveways, sidewalks wider than 8', and turf areas where mowing takes place shall be traffic rated.
- D. Provided with brass hold-down bolts in cover.
- E. Provided with necessary box extensions to gain proper depth.
- F. Seal all conduit in underground boxes with duct seal after conductors have been installed.

2.10 IN-GRADE UTILITY COMPANY BOXES AND VAULTS

- A. In-grade boxes and pads for utility company, shall be as specified by the respective utility company with all of the company's requirements and construction methods met.

2.11 PUTTY PADS

- A. Intumescent moldable firestop putty designed to protect electrical outlet boxes.
- B. Designed to install around outside of outlet boxes.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Conduit systems listed below are for use in installations where they are permitted to be used by CEC and/or other occupancy restrictions. The below installation methods do not intend to suggest that these materials be installed in conflict with any applicable code. Special attention to applications shall be made in building types such as Educational, Health Care, wet location, hazardous locations, assembly occupancy and multi-story, but not limited to these. Requirements which are more restrictive than the CEC may be called for by the drawings and / or these specifications. These requirements must be adhered to. The Electrical Contractor shall be responsible to use the proper conduit system for the application. Exposed conduit is not allowed below ceilings or above slab of floor, without the permission and approval of the Architect. All conduits shall be concealed except in electrical and telecommunication rooms or where shown to be surface mounted. Exposed conduit (where allowed) shall be run square and plumb with building lines in an approved manner. Support roofmount conduits, where allowed, with minimum 12" wide redwood blocks set in mastic unless otherwise detailed in roof requirements or as specified in roofing specification, by the Architect. Strap conduits to blocks with proper sized conduit straps. Spacing of support shall be a minimum as provided for in the CEC. All exposed conduit mounted below 8' above finished grade shall be strapped at a minimum of 5' spacing.

- B. Non-Metallic Rigid Conduit shall be used in concrete slabs, below concrete slabs on grade, or underground outside of a building slab or foundation. Maintain minimum depth requirements and cover with appropriate fill material. Minimum 4" of bedding and cover of backfill material 1/4" size grain and smaller maximum. Conduit shall be heavy wall Schedule 80, rigid PVC only. Rigid utility P&C duct shall not be used in any application. Properly sized grounding conductors shall be installed per CEC article 250, in all non-metallic conduit branch circuit and feeder runs. PVC conduit shall be formed or field bent only with the use of properly approved bending tools such as to not decrease the internal bore of the conduit. All conduits shall be cut square and reamed of burrs. Approved and compatible glue shall be used on all PVC fittings to attain watertight joints. All non-metallic conduit runs over 150' in length and over 1 1/4" trade size conduit shall utilize galvanized rigid steel elbows.
- C. Galvanized Rigid Steel (GRS) conduit shall be used where exposed less than 8'-0" above finished grade to 18" below finished grade and where subject to physical damage. Conduits shall be cut square and reamed to remove burrs and sharp edges. Strap conduit below 8' above grade at 5' intervals. Unless otherwise noted, threadless setscrew and threadless weathertight fittings may be used in lieu of threaded fittings. All threaded ends entering a junction box of any type shall require one locknut on the inside and one on the outside of the enclosure and be provided with a plastic bushing or grounding bushing where necessary for proper grounding. Where exposed to moisture, a watertight hub or other approved method shall be required. All conduits shall be stubbed up straight and uniform into junction boxes, panels, cabinets, etc., and shall be (GRS) properly supported and strapped. All GRS conduit located below grade, shall be tape wrapped.
- D. Electrical Metallic Tubing (EMT) shall be used as allowed by code and as permitted by this specification. It shall not be in contact with soil or the concrete slab on the ground floor of any structure. Connectors and couplings shall be steel insulated set screw type where installed in indoor dry locations not subject to moisture. Where the potential for moisture is present, compression type weathertight fittings are required. One hole conduit straps are permitted from 1/2" to 1" and two hole conduit straps are required for size 1 1/4" and larger. EMT shall not be allowed in areas subject to severe physical damage. Install copper ground wire sized per CEC 250-122 in all EMT conduits.
- E. Flexible conduit may be used where concealed in building construction or above dropped ceilings, but shall meet the following criteria: No individual circuit path from distribution panel to last device shall exceed a cumulative length of 30' of flexible conduit from start to end. Flexible conduit shall not exceed a total directional change of 270 bending degrees in any one run between conduit terminations. Squeeze type or Jake type steel flex fittings of a grounding type are required. Flexible conduit must be supported in accordance with CEC. Where exposed to the weather, moisture, or spray down flexible conduit shall be of the liquidtight type. Fittings shall be manufactured for use with liquidtight flexible conduit. All motor connections shall be made with liquidtight flex. Flexible conduit may not be used where exposed except for last 2' of equipment connection and unless otherwise noted or approved. A copper ground wire sized per CEC 250-122 shall be installed in all flexible conduit runs. Flexible conduit may not be used exposed. Weatherproof liquid tight conduit shall not be used at roof level for equipment connections with lengths exceeding 24" nor shall it be used to circumvent a rigid conduit system in a horizontal direction. Connect recessed lighting fixtures to conduit runs with a maximum of 6' of flexible metal conduit extending from junction box to fixture. "Master" "Slave" fixtures are permitted to use manufactured flexible cable of longer dimension up to 12' between "Master" and "Slave" only and only as a U.L. listed system component.

- F. Underground conduits and transition to above grade/slab shall be as follows:
1. PVC elbows allowed if top of elbow is minimum 18" BFG or below top of slab, otherwise GRS elbows are required.
 2. GRS elbows are required if conduit run is 150' or greater.
 3. GRS risers are required from elbow below grade to equipment (device, outlet, panel, cabinet, etc.) above grade.
 4. GRS elbows/risers to be PVC coated or 10 MIL taped wrapped (1/2" lapped) to 3" above finish grade or top of slab.
- G. Conduit Supports: Conduit runs may be supported by one-hole and two-hole straps or supports as manufactured by Unistrut, Minerallac, Caddy or equals. Supports may be fastened by means of anchors, shields, beam clamps, toggle bolts, or other approved methods appropriate for the application and size of conduit. Pipe nailers (J-hooks) may only be used for 1" conduit and smaller and only in wood frame construction. Conduit support methods are subject to review by the engineer and authority having jurisdiction for adequacy. Installations deemed inadequate shall be corrected by the contractor at no cost to the Owner.
- H. Bends and offsets shall be made with approved tools for the type of conduit being utilized. Bends shall be made without kinking or destroying the smooth bore of the conduit. Parallel conduits shall be run straight and true with bends uniform and symmetrical. Minimum radii shall be per CEC 344-24.
- I. Conduit Stub-outs below grade shall be capped with plastic cap, and identified by placing a pull box marked with correctly identified utility such as "Elec", "Tel", etc. Dimension for exact location on field record drawings. Provide lids for proper field application (i.e. traffic, incidental, pedestrian).
- J. Conduit Seals: Where below grade conduits enter structure through slab or retaining wall of building or basement, seal the inside of each conduit as follows:
1. Provide damming material around conductors 3" into conduit.
 2. Fill 3" of conduit with 3M #2123 sealing compound.
 3. Wrap conductors where they exit the conduit with 3M #2229 "Scotch Seal" mastic tape. Lap tape to approximate diameter of the raceway and wrap outside of conduit opening with (minimum) one turn.
 4. Use conduit sealing bushings type CSB (O-Z/Gedney) or equal.
 5. Empty conduits shall be sealed with standard non-hardening duct seal compound and then capped to prevent entrance of moisture and gases and to meet fire resistance requirements.
 6. Provide cable drip loop minimum 12" high.
- K. Marker tape: Place plastic yellow marker tape at 12" below finish grade along and above buried conduits. Label tape "CAUTION: ELECTRICAL LINES BELOW" or similar wording.
- L. Conduits for high voltage (12kv) systems shall be separated from all other conduits by a minimum of 12". All power system conduits shall be separated from low voltage systems by a minimum of 12" when running parallel to each other and no less than 6" when running perpendicular to each other at conduit crossings.
- M. Electrical and communications systems raceways routed underground shall not occupy the same trench as plumbing utilities such as sewer, water, storm drain, gas or other wet or dry gaseous

utility system. A minimum of 12" of undisturbed earth is required. Where utilities must cross in closer proximity to each other due to physical constraints, 6" minimum crossing distances are allowed, however 18" on all sides of a utility crossing must be concrete encased.

- N. Duct bank defined here-in shall be four or more conduits in a common trench, conduit spacers and saddles shall be required in all trenches where more than two conduits over 2" in diameter travel in the same trench. Proper spacing between systems as outlined above shall be required and spacers shall be located each 5' (maximum) along trench route from point to point.
- O. Conduits, routed below footings, slabs, grade beams, columns, and other structural elements shall be installed in strict compliance with structural details and criteria shown on structural plans. Clearances below structural elements and sleeves through structural elements must be carefully planned to avoid conflict and must be approved by the structural engineer if conflict arises.
- P. All conduit or raceways passing through fire rated walls, floors, or ceilings shall be installed with a listed penetration method which protects the opening to the same rating as the assembly and is non hardening.
- Q. Expansion Joints
 1. Conduits 3" and larger, that are secured to the building structure on opposite sides of a building expansion joint, require expansion and deflection couplings. Install the couplings in accordance with the manufacturer's recommendations.
 2. Provide conduits smaller than 3" with junction boxes on both sides of the expansion joint. Connect conduits to junction boxes with sufficient slack of flexible conduit to produce 5" vertical drop midway between the end. All conduit shall have a copper green grounding bonding conductor installed.
- R. Seismic Joints
 1. At seismic joints, provide conduits rigidly secured to the building structure on opposite sides of a building expansion joint with junction boxes or approved fittings, on both sides of the joint. Connect conduits to junction boxes with sufficient slack flexible conduit such that these slack conduits are 1 1/2 times the distance between conduit ends. Flexible conduit shall have a copper green ground bonding jumper installed.
- S. Wire basket tray shall be used in all concealed spaces (above ceiling spaces, under buildings in access tunnels, below raised floors, etc.) unless otherwise noted. Wire basket tray installations shall conform to the requirements of CEC Article 318. The contractor shall provide all mounting hardware, connectors and bracing as required and as recommended by the manufacturer for a complete system installation. All cutting of wire basket tray shall be per the manufacturer's recommendation using tools designed for that purpose. Cable loading shall not exceed the listing of the system and its support.
- T. Location: Locate boxes and conduit bodies so as to ensure accessibility of electrical wiring.
- U. Anchoring: Secure boxes rigidly to the substrate upon which they are being mounted, or solidly embed boxes in concrete or masonry.
- V. Special Application: Provide weatherproof outlets for locations exposed to weather or moisture.

- W. Knockout Closures: Provide knockout closures to cap unused knockout holes where blanks have been removed.
- X. Mount outlet boxes, unless otherwise required by ADA, or noted on drawings, the following distances above the finished floor:
 - 1. Receptacles, Telephone, TV & Data outlets. (measured to bottom of outlet box): +15".
 - 2. Outlet above counter (measured to top of outlet box): +46".
 - 3. Control (light) Switches. (measured to top of outlet box): +48".
 - 4. Fire Alarm Manual Pull Stations, T-stats. (measured to top of outlet box): +48".
 - 5. Fire Alarm Visuals: the lower of +80" to bottom of lens, or 6" below ceiling.
 - 6. Other Outlets: As indicated in other sections of specifications or as detailed on drawings.
- Y. Coordinate all electrical device locations with the architectural floor plan and interior and exterior elevations to prevent mounting devices within elements that they may conflict such as cabinetry, mirrors, planters, etc.
- Z. Size outlet and junction boxes to minimum wire fill space requirements. Upsize box as required to allow ease of wire installation and device installation.
- AA. Outlet and junction boxes in fire rated walls shall be gauged and spaced so as not to exceed the maximum penetration allowed by the assembly without compromising the fire rating. If a conflict arises relative to a specific condition, the contractor shall follow the requirements of the fire authority and ask for guidance from the design team. At no time should a larger box be installed prior to resolution of conflict.

END OF SECTION

SECTION 26 0546.13

ELECTRIC UTILITY SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

B. This Section Includes:

1. Manholes, handholes and ducts to form a complete underground raceway system.
2. "Duct" and "conduit", and "raceway" are used interchangeably in this specification and have the same meaning. Refer to Section 26 0533, RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS for approved raceway and materials as well as execution.
3. Scope of Work: Furnishing, installation and connection of manholes, handholes and ducts to form a complete underground raceway system for distribution of electrical and signal systems and utility service entrance facilities. This specification shall also provide guidance for construction of the utility company underground and substructure requirements. Contact serving company directly and obtain current detailed requirements of installation and adhere by same. Provide trenching, conduit, backfill, boxes and equipment pads as applicable. Nothing here in shall be construed to be in conflict with the requirements of the utility company, which shall take precedence over any possible conflicting requirement.

C. Related Work:

1. SITEWORK.
2. FLATWORK.
3. LANDSCAPING.
4. Section 26 0500, COMMON WORK RESULTS FOR ELECTRICAL.
5. Section 26 0533, RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS: Conduits, fittings and boxes for raceway systems.
6. Section 26 0526, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.

1.03 SUBMITTALS

- D. Submit in accordance with Section 26 0500, COMMON WORK RESULTS FOR ELECTRICAL.

E. Shop Drawings:

1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
2. Include manholes, handholes, duct materials, and hardware. Proposed deviations from details on the drawings shall be clearly marked on the submittals.

3. If necessary to locate manholes or handholes at locations other than shown on the drawings, show the proposed locations accurately on scaled site drawings.
4. Precast manholes and handholes: Submit detail drawings and design calculations for approval prior to installation.

1.05 APPLICABLE PUBLICATIONS

- F. Publications listed below (including amendments, addenda, revisions, supplements, and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.

G. Underwriters Laboratories, Inc. (UL):

1. UL 467 Grounding and Bonding Equipment
2. UL 651 Schedule 40 and 80 Rigid PVC Conduit
3. UL 6 Electrical Rigid Metal Conduit-Steel

H. National Fire Protection Association (NFPA):

1. 70 California Electrical Code (CEC)

I. National Electrical Manufacturers Association (NEMA):

1. RN 1 Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit
2. TC 2 Electrical Polyvinyl Chloride (PVC) Tubing And Conduit
3. TC 3 PVC Fittings For Use With Rigid PVC Conduit And Tubing

J. American Concrete Institute (ACI):

1. 318 Building Code Requirements For Structural Concrete

K. American Society for Testing and Materials (ASTM):

1. C478 Standard Specification for Precast Reinforced Concrete Manhole Sections
2. C478M Standard Specification for Precast Reinforced Concrete Manhole Sections (Metric).
3. F512-95 Standard Specification for Smooth-Wall Polyvinyl Chloride (PVC) Conduit and Fittings for Underground Installation

- L. Utility company Handout Package and Construction Requirements for Underground and Substructure Installation.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Concrete: ACI 318, 3000 psi minimum 28 day compressive strength.

- B. Reinforcing Steel: Number 4 minimum.

C. Manhole Hardware:

1. Frames and covers (traffic type).
2. Sump frames and gratings.

3. Pulling Irons: 7/8" diameter hot dipped galvanized steel bar with exposed triangular shaped opening.
4. Cable supports:
 - a. Cable stanchions, hot rolled, heavy duty, hot dipped galvanized "T" section steel 2 1/4" by 1/4" in size and punched with 14 holes on 1 1/2" centers for attaching cable arms.
 - b. Cable arms, 3/16" gage, hot rolled, hot dipped galvanized sheet steel pressed to channel shape. Arms shall be approximately 2 1/2" wide and 14" long.
 - c. Insulators for cable supports, high glazed, wet process porcelain.
 - d. Spares: Equip each cable stanchion with two spare cable arms and six spare insulators for future use.
 - e. Miscellaneous hardware, hot dipped galvanized steel.
- D. Handhole Hardware:
 1. Frames and covers configuration as shown on the drawings.
 2. Pulling irons, 7/8" diameter galvanized steel bar with exposed triangular shaped opening.
- E. Cable supports are not required.
- F. Ground Rod Sleeve: Provide a 3" PVC sleeve in manhole floors so that a driven ground rod may be installed.
- G. Manholes and Handholes shall be precast units and be constructed as described below. Units shall comply with ASTM C478, C478M.
 1. Size: Plan area and clear height shall be not less than that shown on the drawings.
 2. Accessories, hardware, and facilities shall be the same as required for poured in place type.
 3. Assume ground water level 3' below ground surface unless a higher water table is shown in the boring logs and adjust design accordingly.
- H. Ducts:
 1. Size shall be as shown on drawings.
 2. Ducts (concrete encased):
 - a. Plastic Conduit:
 - 1) NEMA TC6 & 8 and TC9 plastic utilities conduit UL 651 and 651A Schedule 40 PVC.
 - 2) Duct shall be suitable for use with 90 degree C rated conductors.
 3. Ducts (direct burial):
 - a. Plastic duct:
 - 1) NEMA TC2 and TC3, EPC-40, Type II.
 - 2) UL 651 and 651A, Schedule 40 Schedule 80 PVC.
 - 3) Duct shall be suitable for use with 75 degree C rated conductors.
 - b. Rigid metal conduit, PVC-coated: UL6 and NEMA RN1 galvanized rigid steel, threaded type, coated with PVC sheath bonded to the galvanized exterior surface, nominal 0.040" thick.
- I. Ground Rods: Per Section 26 0526, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.
- J. Ground Wire: Stranded bare copper No. 6 AWG minimum.
- K. Conduit Spacers: Prefabricated plastic.

- L. Warning Tape: Standard 4 mil polyethylene 3" wide tape, detectable type, red with black letters, imprinted with "CAUTION BURIED ELECTRIC CABLE BELOW".
- M. Pull Rope: Plastic with 200 pound minimum tensile strength.

PART 3 - EXECUTION

3.01 TRENCHING

- A. Refer to EARTHWORK section of specification for trenching back-filling, and compaction requirements.
- B. Work with extreme care near existing ducts, conduits, cables, and other utilities to avoid damaging them.
- C. Cut the trenches neatly and uniformly for utility company trenches, notify for inspections by utility company a minimum of 48 hours in advance.
- D. Conduits to be installed under existing paved areas, roads, and railroad tracks which are not to be disturbed shall be protected into place. Conduits shall be minimum 36" cover.
- E. Trench Preparation: A 4" sand bedding is required if trench bottom is not rock free. A 4" sand covering over the cable is required if the native backfill is not rock free. Backfill and compaction should meet City, County, State and utility company requirements. The serving utility company may required 100% sand backfill. All backfill requirements shall also meet or exceed those set forth in the earthwork or civil section of this specification.
- F. Excavation: Provide 6" gravel in bottom of excavated holes for subsurface transformers and all concrete boxes. Spare gravel shall be available for final adjustment. The Contractor is responsible for final grade level of enclosures and boxes. Non-conformance will be corrected by electrical contractor at his expense.
- G. Conduit Routing: Sharp turns, bends, or other irregularities in the conduit must be avoided. Minimum radius bends shall be as required by the serving utility company. Every effort should be made to obtain a straight water tight conduit line. The end of all spare conduits must be capped. The utility company Inspector must approve deviation from layout.
- H. Conformance: All work must conform to the utility company "handout package" and Specification 59 and/or 99. Copies are available from the utility company upon request.
- I. Joint Trenching: Maintain all required depths, clearance and separations as required by code, ordinance or utility company policies. Coordinate with other utilities to confirm requirements.

3.02 OTHER PADMOUNTED EQUIPMENT

- J. Provide adequately sized and reinforced concrete pads with openings for conduit(s) as necessary by the utility company and or the equipment manufacturer.
- K. A grounding system shall be installed at each padmounted piece of equipment including, but not limited to, a ground rod, grounding conductor, ufer, and ground grid (if called for).
- L. Padmounted equipment shall be bolted to concrete pad with minimum 5/8" x 7 1/2" anchor bolts, one in each of 4 corners of each section of padmounted equipment.

END OF SECTION

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SECTION 26 0546.16
TELEPHONE UTILITY SERVICE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Work:
 - 1. Section 26 0533, RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS.
 - 2. Section 31 2000, EARTHMOVING.

1.02 WORK INCLUDED

- A. Contact the serving utility company at start of construction and again 30 days prior to date that service cable placement will be required.
- B. Compliance with Standards: the serving utility company reserves the right to refuse to use any conduit, pullboxes, manholes or utility boxes that deviate from applicable building codes, plans and/or specifications.

1.03 DEFINITIONS

- A. MTTB: Main Telephone Terminal Board
- B. RNC: Rigid nonmetallic conduit
- C. UFER: concrete-encased electrode

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Main Telephone Terminal Board (MTTB) shall be provided with a #6 THHN solid copper ground wire in 1/2" conduit run to a main electric service ground: either the concrete-encased electrode ("UFER") or the metal underground water pipe. Provide with minimum of 30" clear working space shall be provided in front of MTTB. If in a closet, no door sills or center posts shall obstruct access.
- B. Interior MTTB shall be 3/4" thick plywood sized and located per plan. Fasten securely to wall. Provide with adjacent 120 volt double duplex receptacle on dedicated 20amp circuit.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Service Conduits shall be RNC Schedule 40 or GT-80 below grade except at bends up to and including above grade which shall be RNC Schedule 80. Verify with utility prior to installation.
 - 1. Mandrel and measure conduits end-to-end to facilitate the utility ordering of cables.
 - 2. Provide minimum 3/16" pull rope in each conduit.
 - 3. Minimum cover for conduit shall be 30".
 - 4. Minimum separation from power conduit(s) in joint trench shall be 12" of compacted soil or 3" of concrete.
 - 5. Conduits at backboard shall extend 2" above finish floor or 6" below ceiling and 1" out from face of backboard.
 - 6. Minimum radius of bends from trench to building shall be 36".
- B. 300' Conduit length and bending limits: Unless otherwise shown on the plan, service entrance conduit length shall not exceed for 4" conduit or 250' for 2" conduit. Not including risers, conduits shall have a maximum of 270 degrees total of bending including a maximum of two 90 degree bends. If these limits are exceeded, a pull box will be required.
- C. All manholes, pullboxes and utility boxes shall be sized per plan with cover marked "TELEPHONE" as manufactured by Associated Concrete or Plastic Products "Quikset", Brooks, Christy or equal as approved by the utility company.
 - 1. Pullboxes shall be provided with cable racking and torsion parkway cover. If required by the utility, also provide with 5' ground rod driven 4' into ground.
 - 2. Utility boxes shall be provided with 5' ground rod driven 4' into ground if required by the utility.

END OF SECTION

SECTION 26 0546.19
CABLE TELEVISION (CATV) UTILITY SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Work:
 - 1. Section 26 0533, RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS.
 - 2. Section 31 2000, EARTHMOVING.

1.02 Work Included

- A. Contact the serving Cable Television (CATV) utility company at start of construction and again 30 days prior to date CATV service cable placement will be required.
- B. Compliance with Standards: The utility company reserves the right to refuse to use any conduit, pullboxes, manholes or utility boxes that deviate from applicable building codes, utility standards, plans and/or specifications.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Provide a complete conduit infrastructure for installation of the utility service cable. Materials shall comply with applicable portions of specification sections 26 0533, RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Provide all trenching, excavations, and rock-free backfill (1/4" screen) and service conduits. Notify serving company 48 hours before backfill.
- B. Service Conduits shall be RNC Schedule 40 or GT-80 below grade except at bends up to and including above grade which shall be RNC Schedule 80. Verify with utilities prior to installation.
 - 1. Mandrel and measure conduits end-to-end to facilitate installation of CATV cables.
 - 2. Provide minimum 3/16" pull rope in each conduit.

3. Minimum cover for conduit shall be 24".
 4. Minimum separation from power conduit(s) in joint trench shall be 12" of compacted soil or 3" of concrete.
 5. Conduits at backboard shall extend 2" above finish floor or 6" below ceiling and 1" out from face of backboard.
 6. Minimum radius of bends from trench to building shall be 36".
- C. Conduit length and bending limits: Unless otherwise shown on the plan, service entrance conduit length shall not exceed 500'. Not including risers, conduits shall have a maximum of 270 degrees total of bending including a maximum of two 90-degree bends. If these limits are exceeded, a pull box will be required.
- D. All manholes, pullboxes and utility boxes shall be sized per plan with cover marked "Cable TV" as manufactured by Associated Concrete or Plastic Products "Quikset", Brooks, Christy or equal as approved by utility company.
- E. Conduits must enter boxes with a 90 degree sweep and shall be no more than a 15 degree angle from the main line trench.
- F. Pullropes: Install 3/16" polypropylene 800 lb. minimum test pull line in 2" conduits and 1/8" polypropylene 200 lb. minimum test pull line in 1" conduits.
- G. Locations of existing underground facilities shall be obtained by calling Underground Service Alert at least 48 hours in advance, 800-642-2444.

END OF SECTION

SECTION 26 0548

VIBRATION AND SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes the following:

1. Isolation pads.
2. Channel support systems.
3. Restraint cables.
4. Hanger rod stiffeners.
5. Anchorage bushings and washers.

- B. Related Sections include the following:

1. Section 26 0529 "Hangers and Supports for Electrical Systems" for commonly used electrical supports and installation requirements.

1.03 DEFINITIONS

- A. The IBC: International Building Code.

- B. ICC-ES: ICC-Evaluation Service.

1.04 PERFORMANCE REQUIREMENTS

- A. Seismic-Restraint Loading:

1. Site Class as Defined in the IBC: D.
2. Assigned Seismic Use Group or Building Category as Defined in the IBC:
 - a. Component Importance Factor: 1.0.
 - b. Component Response Modification Factor: 3.0.
 - c. Component Amplification Factor: 2.5.
3. Design Spectral Response Acceleration at Short Periods (0.2 Second): $S_{DS}=1.361g$.
4. Design Spectral Response Acceleration at 1.0-Second Period: $S_{D1}=0.663g$.

1.05 ACTION SUBMITTALS

- A. Product Data: For the following:

1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
2. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of seismic-restraint component used.

1.06 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Show coordination of seismic bracing for electrical components with other systems and equipment in the vicinity, including other supports and seismic restraints.
- B. Qualification Data: For testing agency.
- C. Welding certificates.
- D. Field quality-control test reports.

1.07 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
- B. Comply with seismic-restraint requirements in the IBC unless requirements in this Section are more stringent.
- C. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- D. Seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall bear anchorage preapproval OPA number from OSHPD, preapproval by ICC-ES, or preapproval by another agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are not available, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a qualified professional engineer.
- E. Comply with NFPA 70.

PART 2 - PRODUCTS

2.01 VIBRATION ISOLATORS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. [Ace Mountings Co., Inc.](#)
2. [Amber/Booth Company, Inc.](#)
3. [California Dynamics Corporation.](#)
4. [Isolation Technology, Inc.](#)
5. [Kinetics Noise Control.](#)
6. [Mason Industries.](#)
7. [Vibration Eliminator Co., Inc.](#)
8. [Vibration Isolation.](#)
9. [Vibration Mountings & Controls, Inc.](#)

C. Pads: Arrange in single or multiple layers of sufficient stiffness for uniform loading over pad area, molded with a nonslip pattern and galvanized-steel baseplates, and factory cut to sizes that match requirements of supported equipment.

1. Resilient Material: Oil- and water-resistant rubber.

2.02 SEISMIC-RESTRAINT DEVICES

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:

1. [Amber/Booth Company, Inc.](#)
2. [California Dynamics Corporation.](#)
3. [Cooper B-Line, Inc.; a division of Cooper Industries.](#)
4. [Hilti Inc.](#)
5. [Loos & Co.; Seismic Earthquake Division.](#)
6. [Mason Industries.](#)
7. [TOLCO Incorporated; a brand of NIBCO INC.](#)
8. [Unistrut; Tyco International, Ltd.](#)

B. General Requirements for Restraint Components: Rated strengths, features, and application requirements shall be as defined in reports by an agency acceptable to authorities having jurisdiction.

1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.

C. Channel Support System: MFMA-3, shop- or field-fabricated support assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; and rated in tension, compression, and torsion forces.

D. Restraint Cables: ASTM A 492 stainless-steel cables with end connections made of steel assemblies with thimbles, brackets, swivels, and bolts designed for restraining cable service; and with a minimum of two clamping bolts for cable engagement.

- E. Hanger Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections to hanger rod. Do not weld stiffeners to rods.
- F. Bushings for Floor-Mounted Equipment Anchor: Neoprene bushings designed for rigid equipment mountings, and matched to type and size of anchors and studs.
- G. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for rigid equipment mountings, and matched to type and size of attachment devices.
- H. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.
- I. Mechanical Anchor: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchors with strength required for anchor and as tested according to ASTM E 488. Minimum length of eight times diameter.

2.03 FACTORY FINISHES

- A. Finish: Manufacturer's standard prime-coat finish ready for field painting.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine areas and equipment to receive vibration isolation and seismic-control devices for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 APPLICATIONS

- A. Multiple Raceways or Cables: Secure raceways and cables to trapeze member with clamps approved for application by an agency acceptable to authorities having jurisdiction.
- B. Hanger Rod Stiffeners: Install hanger rod stiffeners where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods due to seismic forces.
- C. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static and seismic loads within specified loading limits.

3.03 SEISMIC-RESTRAINT DEVICE INSTALLATION

A. Equipment and Hanger Restraints:

1. Install restrained isolators on electrical equipment.
2. Install resilient, bolt-isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch (3.2 mm).
3. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction providing required submittals for component.

B. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.

C. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.

D. Drilled-in Anchors:

1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
5. Set anchors to manufacturer's recommended torque, using a torque wrench.
6. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

3.04 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

- A. Install flexible connections in runs of raceways and cables where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where they terminate with connection to equipment that is anchored to a different structural element from the one supporting them as they approach equipment.**

3.05 FIELD QUALITY CONTROL

- A. Testing Agency:** Owner will engage a qualified testing agency to perform tests and inspections and prepare test reports.

- B. Perform tests and inspections.**

C. Tests and Inspections:

1. Provide evidence of recent calibration of test equipment by a testing agency acceptable to authorities having jurisdiction.
2. Schedule test with Engineer before connecting anchorage device to restrained component (unless postconnection testing has been approved), and with at least seven days' advance notice.
3. Obtain Engineer's approval before transmitting test loads to structure. Provide temporary load-spreading members.
4. Test at least four of each type and size of installed anchors and fasteners selected by Engineer.
5. Test to 90 percent of rated proof load of device.
6. If a device fails test, modify all installations of same type and retest until satisfactory results are achieved.

D. Remove and replace malfunctioning units and retest as specified above.

E. Prepare test and inspection reports.

3.06 ADJUSTING

A. Adjust isolators after isolated equipment is at operating weight.

B. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.

C. Adjust active height of spring isolators.

D. Adjust restraints to permit free movement of equipment within normal mode of operation.

END OF SECTION

SECTION 26 0553

IDENTIFICATION OF ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section Includes:
1. Nameplates and warning signs where specified herein and as shown on contract documents including the following:
 - a. Nameplates and warning signs permanently installed on all electrical equipment and devices including, but not limited to, the following items:
 - 1) Enclosures for transformers, switchboards, motor control, panels, pullboxes, cabinets, motors, generators, transfer switches.
 - 2) Enclosures for all separately enclosed devices including, but not limited to, disconnect switches, circuit breakers, contactors, time switches, control stations and relays, fire alarm panels and lighting control panel.
 - 3) Wall switches not within sight of outlet controlled.
 - 4) Special systems such as, but not limited to, telephone, fire alarm, warning and signal systems. Identification shall be at each equipment rack, terminal cabinet, control panel, annunciator and pullbox.
 - 5) Devices mounted within and part of equipment including circuit breakers, switches, control devices, control transformers, relays, indication devices and instruments.
 2. Conductor and Cable Identification.
- B. Related Work:
1. Section 26 0500, COMMON WORK RESULTS FOR ELECTRICAL.
 2. Section 26 0519, LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES.
 3. Section 26 1300, MEDIUM VOLTAGE SWITCHGEAR (ABOVE 600 VOLTS).
 4. Section 26 1302, SWITCHES, MEDIUM VOLTAGE (ABOVE 600 VOLTS).
 5. Section 26 2416, PANELBOARDS.
 6. Section 26 2816, ENCLOSED SWITCHES AND CIRCUIT BREAKERS.
 7. Section 26 1200, MEDIUM VOLTAGE TRANSFORMERS.
 8. Section 26 2414, DISTRIBUTION SWITCHBOARD.
 9. Section 26 0534, CABINETS.
 10. Section 26 2413, SERVICE AND DISTRIBUTION SWITCHBOARD.

PART 2 - PRODUCTS

2.01 EQUIPMENT LABEL DESIGNATIONS

- A. Equipment labels indicating equipment designations both emergency and normal. Designation data per drawings or to be supplied with shop drawings approval.
- B. Panelboard labels showing panel designation, voltage, phase and source.
- C. In accordance with CEC 110.16, provide arc flash protection warning labels on all switchboards, panelboards, distribution panels, transformers, safety switches, transfer equipment, etc. Labels shall be per ANSI Z535.4 guidelines.

2.02 MATERIALS

- A. For Labels: Three layer laminated plastic or micarta with engraved white letters over black background.
- B. For Emergency Equipment: Use engraved white letters over red background.
- C. For Warning Signs: Minimum 18 gauge steel with red lettering on white porcelain enamel finish.
- D. Arc flash labels shall be provided as required by CEC Article 70E.
- E. Conductor tape number markers: TayMac MX4280 Series non-fading permanent adhesive.

PART 3 - EXECUTION

3.01 MOUNTING

- A. Equipment labels shall be mounted by self-tapping, threaded screws and bolts, or by rivets. Adhesive types are not acceptable unless specifically noted in this section.
- B. Conductor tape markers shall be consistently placed for ready conductor identification.

3.02 HEIGHTS ON LABELS

- A. Panelboards, Switchboards and Motor Control Centers and Special Systems Enclosures: 1/4" identify equipment designation; 1/8" identify voltage rating and source.
- B. Individual Circuit Breakers, Switches, and Motor Starters in Panelboards, Switchboards, and Motor Control Centers: 3/16" identify circuit and load served, including location of equipment.
- C. Enclosed Circuit Breakers, Enclosed Switches, and Motor Starters: 3/16" identify load served.

- D. Transformers: 3/16" identify equipment designation; 1/8" identify primary and secondary voltages, primary source and secondary load. Include location of primary source or secondary load if remote from transformer.

3.03 WARNING SIGNS

- A. Warning signs shall be permanently mounted with cadmium plated steel screws or nickel-plated brass bolts.
- B. Warning signs to read "DANGER - HIGH VOLTAGE", with letters 1 1/2" high, 3/16" stroke minimum.
- C. Provide warning sign on all doors or immediately next to door for equipment rooms, enclosures or closets containing equipment energized above 150 volts to ground as per CEC, and/or as directed by the Architect. For interior finish spaces and interior doors, signage shall be coordinated and approved with the Architect in advance of installation.

END OF SECTION

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SECTION 26 0573
OVERCURRENT PROTECTIVE DEVICE COORDINATION

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section specifies the requirements of the Overcurrent Protective Device Coordination.
- B. A short circuit and coordination study shall be prepared for the electrical overcurrent devices to be installed under this project to assure selective coordination, proper equipment and personnel protection.
- C. The study shall present an organized time current analysis of each protective device in series from the individual overcurrent device back to the utility and the on-site generator sources. The study shall reflect the operation of each device during normal and abnormal current conditions.
- D. Implement as part of this contract, all manufacturer's recommendations for maximum protection and best selective coordination at no additional cost to Owner.
- E. The Contractor shall furnish an ARC Flash analysis study per NFPA 70E – Standard For Electrical Safety In The Workplace, Reference Article 130.3 and Appendix D.

1.02 RELATED WORK

- A. Section 26 0500, COMMON WORK RESULTS FOR ELECTRICAL.
- B. Section 26 2416, PANELBOARDS: Low voltage panelboards.
- C. Section 26 1300, SWITCHGEAR, HIGH VOLTAGE (ABOVE 600 VOLTS): Primary distribution switchgear.
- D. Section 26 1302, SWITCHES, HIGH VOLTAGE (ABOVE 600 VOLTS): Primary switches.
- E. Section 26 2414, DISTRIBUTION SWITCHBOARDS: Low voltage distribution switchboards.

1.03 SUBMITTALS

- A. In accordance with Section 26 0500, COMMON WORK RESULTS FOR ELECTRICAL, submit the following:
 - 1. Complete short circuit and coordination study as described herein.
 - 2. Protective equipment shop drawings shall be submitted simultaneously with or after the protective device study. Protective equipment shop drawings will not be accepted prior to protective device study.
 - 3. Certification: Two weeks prior to final inspection, submit four copies of the following to the Engineer:

- a. Certification by the Contractor that the protective devices have been adjusted and set in accordance with the approved protective device study.
- b. Final setting values for each adjustable trip device.

1.04 REFERENCES

- A. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
 - 1. IEEE 141 – Recommended Practice for Electric Power Distribution and Coordination of Industrial and Commercial Power Systems
 - 2. IEEE 242 – Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems
 - 3. IEEE 399 – Recommended Practice for Industrial and Commercial Power System Analysis
 - 4. IEEE 241 – Recommended Practice for Electric Power Systems in Commercial Buildings
 - 5. IEEE 1015 – Recommended Practice for Applying Low-Voltage Circuit Breakers Used in Industrial and Commercial Power Systems.
 - 6. IEEE 1584 - Guide for Performing Arc-Flash Hazard Calculations
- B. American National Standards Institute (ANSI):
 - 1. ANSI C57.12.00 – Standard General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers
 - 2. ANSI C37.13 – Standard for Low Voltage AC Power Circuit Breakers Used in Enclosures
 - 3. ANSI C37.010 – Standard Application Guide for AC High Voltage Circuit Breakers Rated on a Symmetrical Current Basis
 - 4. ANSI C 37.41 – Standard Design Tests for High Voltage Fuses, Distribution Enclosed Single-Pole Air Switches, Fuse Disconnecting Switches and Accessories.
- C. The National Fire Protection Association (NFPA)
 - 1. NFPA 70 - National Electrical Code, latest edition
 - 2. NFPA 70E – Standard for Electrical Safety in the Workplace

1.05 QUALIFICATIONS

The protective device study shall be prepared by qualified engineers of the high voltage switchgear manufacturer or an approved consultant. The Contractor is responsible for providing all pertinent information required by the preparers to complete the study. Submit engineer's qualifications with study.

1.06 REQUIREMENTS

- A. The complete study shall include a system one line diagram, short circuit and ground fault analysis, and protective coordination plots.
- B. One Line Diagram:

1. Show on the one line diagram, all electrical equipment and wiring to be protected by the overcurrent devices installed under this project. Clearly show, on the one line, the schematic wiring of the electrical distribution system.
 2. Also show on the one line diagram the following specific information:
 - a. Calculated fault impedance, X/R ratios, and short circuit values at each bus.
 - b. Breaker and fuse ratings.
 - c. Generator kW and Transformer kVA and voltage ratings, percent impedance, X/R ratios, and wiring connections.
 - d. Voltage at each bus.
 - e. Identification of each bus.
 - f. Conduit material, feeder sizes, length, and X/R ratios.
- C. Short Circuit Study:
1. Systematically calculate the fault impedance to determine the available short circuit and ground fault currents at each bus. Incorporate the motor contribution in determining the momentary and interrupting ratings of the protective devices.
 2. The study shall be calculated by means of a computer program. Pertinent data and the rationale employed in developing the calculations shall be incorporated in the introductory remarks of the study.
 3. Present the data determined by the short circuit study in a table format. Include the following:
 - a. Device identification.
 - b. Operating voltage.
 - c. Protective device.
 - d. Device rating.
- D. Calculated short circuit current.
- E. Coordination Curves:
1. Prepare the coordination curves to determine the required settings of protective devices to assure selective coordination. Graphically illustrate on log paper that adequate time separation exists between series devices, including the utility company upstream device. Plot the specific time current characteristics of each protective device in such a manner that all upstream devices will be clearly depicted on one sheet.
 2. The following specific information shall also be shown on the coordination curves:
 - a. Device identification.
 - b. Voltage and current ratio for curves.
 - c. 3-phase and 1-phase ANSI damage points for each transformer.
 - d. No damage, melting, and clearing curves for fuses.
 - e. Cable damage curves.
 - f. Transformer inrush points.
 - g. Maximum short circuit cutoff point.
 3. Develop a table to summarize the settings selected for the protective devices. Include the following in the table:
 - a. Device identification.
 - b. Relay CT ratios, tap, time dial, and instantaneous pickup.
 - c. Circuit breaker sensor rating, long time, short time, and instantaneous settings, and time bands.
 - d. Fuse rating and type.
 - e. Ground fault pickup and time delay.

1.07 ANALYSIS

- A. Analyze the short circuit calculations, and highlight any equipment that is determined to be underrated as specified. Propose approaches to effectively protect the underrated equipment.
- B. After developing the coordination curves, highlight areas lacking coordination. Present a technical evaluation with a discussion of the logical compromises for best coordination.

1.08 ADJUSTMENTS, SETTINGS AND MODIFICATIONS

- A. Necessary final field adjustments, settings and minor modifications shall be made to conform with the protective device study without additional cost to the Owner.
- B. All final circuit breaker and relay settings and fuse sizes shall be made in accordance with the recommendations of the protective device study.

PART 2 - PRODUCTS

2.01 STUDIES

- A. Contractor to furnish short-circuit and protective device coordination studies as prepared by equipment manufacturer or an approved consultant.
- B. The contractor shall furnish an Arc Flash Hazard Analysis Study per NFPA 70E - Standard for Electrical Safety in the Workplace, reference Article 130.3 and Annex D.

2.02 DATA COLLECTION

- A. Contractor shall furnish all data as required by the power system studies. The Engineer performing the short-circuit, protective device coordination and arc flash hazard analysis studies shall furnish the Contractor with a listing of required data immediately after award of the contract. The Contractor shall expedite collection of the data to assure completion of the studies as required for final approval of the distribution equipment shop drawings and/or prior to the release of the equipment for manufacturing.
- B. Source combination may include present and future motors and generators.
- C. Load data utilized shall include proposed loads obtained from Contract Documents provided by Owner, or Contractor.
- D. Include fault contribution of existing motors in the study, with motors greater than 25 hp. The Contractor shall obtain required existing equipment data, if necessary, to satisfy the study requirements.

2.03 SHORT-CIRCUIT AND PROTECTIVE DEVICE EVALUATION STUDY

- A. Use actual conductor impedances if known. If unknown, use typical conductor impedances based on IEEE Standards 141-1993.
- B. Transformer design impedances shall be used when test impedances are not available.
- C. Provide the following:
 - 1. Calculation methods and assumptions
 - 2. Selected base per unit quantities
 - 3. One-line diagram of the system being evaluated
 - 4. Source impedance data, including electric utility system and motor fault contribution characteristics
 - 5. Typical calculations
 - 6. Tabulations of calculated quantities
 - 7. Results, conclusions, and recommendations.
- D. Calculate short-circuit momentary and interrupting duties for a three-phase bolted fault at each:
 - 1. Electric utility's supply termination point
 - 2. Incoming switchgear
 - 3. Unit substation primary and secondary terminals
 - 4. Low voltage switchgear
 - 5. Motor control centers
 - 6. Standby generators and automatic transfer switches
 - 7. Branch circuit panelboards
 - 8. Other significant locations throughout the system.
- E. For grounded systems, provide a bolted line-to-ground fault current study for areas as defined for the three-phase bolted fault short-circuit study.
- F. Protective Device Evaluation:
 - 1. Evaluate equipment and protective devices and compare to short circuit ratings
 - 2. Adequacy of switchgear, motor control centers, and panelboard bus bars to withstand short-circuit stresses
 - 3. Adequacy of transformer windings to withstand short-circuit stresses
 - 4. Cable and busway sizes for ability to withstand short-circuit heating
 - 5. Notify Owner in writing, of existing, circuit protective devices improperly rated for the calculated available fault current.

2.04 PROTECTIVE DEVICE COORDINATION STUDY

- A. Proposed protective device coordination time-current curves shall be graphically displayed on log-log scale paper.
- B. Include on each curve sheet a complete title and one-line diagram with legend identifying the specific portion of the system covered.

- C. Terminate device characteristic curves at a point reflecting maximum symmetrical or asymmetrical fault current to which device is exposed.
- D. Identify device associated with each curve by manufacturer type, function, and, if applicable, tap, time delay, and instantaneous settings recommended.
- E. Plot the following characteristics on the curve sheets, where applicable:
 - 1. Electric utility's protective device
 - 2. Medium voltage equipment relays
 - 3. Medium and low voltage fuses including manufacturer's minimum melt, total clearing, tolerance, and damage bands
 - 4. Low voltage equipment circuit breaker trip devices, including manufacturer's tolerance bands
 - 5. Transformer full-load current, magnetizing inrush current, and ANSI transformer withstand parameters
 - 6. Conductor damage curves
 - 7. Ground fault protective devices, as applicable
 - 8. Pertinent motor starting characteristics and motor damage points
 - 9. Pertinent generator short-circuit decrement curve and generator damage point
 - 10. Other system load protective devices for the largest branch circuit and the largest feeder circuit breaker in each motor control center.
- F. Provide adequate time margins between device characteristics such that selective operation is provided, while providing proper protection.

2.05 ARC FLASH HAZARD ANALYSIS

- A. The arc flash hazard analysis shall be performed according to the IEEE 1584 equations that are presented in NFPA70E-2004, Annex D.
- B. When appropriate, the short circuit calculations and the clearing times of the phase overcurrent devices will be retrieved from the short-circuit and coordination study model. Alternative methods shall be presented in the proposal.
- C. The flash protection boundary and the incident energy shall be calculated at all significant locations in the electrical distribution system (switchboards, switchgear, motor-control centers, panelboards, busway and splitters) where work could be performed on energized parts.
- D. The Arc-Flash Hazard Analysis shall include all significant locations in 208 volt systems fed from transformers equal to or greater than 45 kVA.
- E. Safe working distances shall be specified for calculated fault locations based upon the calculated arc flash boundary considering an incident energy of 1.2 cal/cm².
- F. The Arc Flash Hazard analysis shall include calculations for maximum and minimum contributions of fault current magnitude. The minimum calculation shall assume that the utility contribution is at a minimum and shall assume a minimum motor load. Conversely, the maximum calculation shall assume a maximum contribution from the utility and shall assume motors to be operating under full-load conditions.

- G. Arc flash computation shall include both line and load side of main breaker calculations, where necessary.
- H. Arc Flash calculations shall be based on actual overcurrent protective device clearing time. Maximum clearing time will be capped at 2 seconds based on IEEE 1584-2002 section B.1.2.

2.06 REPORT SECTIONS

- A. Input Data:
 - 1. Short-circuit reactance of rotating machines
 - 2. Cable and conduit materials
 - 3. Bus ducts
 - 4. Transformers
 - 5. Reactors
 - 6. Aerial lines
 - 7. Circuit resistance and reactive values.
- B. Short-Circuit Data:
 - 1. Source fault impedance and generator contributions
 - 2. X to R ratios
 - 3. Asymmetry factors
 - 4. Motor contributions
 - 5. Short circuit kVA
 - 6. Symmetrical and asymmetrical fault currents.
- C. Recommended Protective Device Settings:
 - 1. Phase and Ground Relays:
 - a. Current transformer ratio
 - b. Current setting
 - c. Time setting
 - d. Instantaneous setting
 - e. Specialty non-overcurrent device settings
 - f. Recommendations on improved relaying systems, if applicable.
 - 2. Circuit Breakers:
 - a. Adjustable pickups and time delays (long time, short time, ground)
 - b. Adjustable time-current characteristic
 - c. Adjustable instantaneous pickup
 - d. Recommendations on improved trip systems, if applicable.
- D. Incident energy and flash protection boundary calculations
 - 1. Arcing fault magnitude
 - 2. Device clearing time
 - 3. Duration of arc
 - 4. Arc flash boundary
 - 5. Working distance
 - 6. Incident energy
 - 7. Hazard Risk Category
 - 8. Recommendations for arc flash energy reduction

PART 3 - EXECUTION

3.01 EQUIPMENT AND FIELD ADJUSTMENTS

- A. Adjust relay and protective device settings according to the recommended settings table provided by the coordination study. Field adjustments to be completed by the engineering service division of the equipment manufacturer under the Startup and Acceptance Testing contract portion.
- B. Make modifications to equipment as required to accomplish conformance with short circuit and protective device coordination studies and include all recommendations.
- C. Following completion of all studies, acceptance testing and startup by the field engineering service division of the equipment manufacturer, a 2-year warranty shall be provided on all components manufactured by the engineering service parent manufacturing company.

3.02 ARC FLASH WARNING LABELS

- A. The Contractor shall provide a 3.5 in. x 5 in. thermal transfer type label of high adhesion polyester for each work location analyzed, a sample is included in this specification.
- B. The label shall have an orange header with the wording, “WARNING, ARC FLASH HAZARD”, and shall include the following information:
 - 1. Location designation
 - 2. Nominal voltage
 - 3. Flash protection boundary
 - 4. Hazard risk category
 - 5. Incident energy
 - 6. Working distance
 - 7. Engineering report number, revision number and issue date.
- C. Labels shall be machine printed, with no field markings.
- D. Arc flash labels shall be provided in the following manner and all labels shall be based on recommended overcurrent device settings.
 - 1. For each 600, 480 and applicable 208 volt panelboards, one arc flash label shall be provided.
 - 2. For each motor control center, one arc flash label shall be provided.
 - 3. For each low voltage switchboard, one arc flash label shall be provided.
 - 4. For each switchgear, one flash label shall be provided.
 - 5. For medium voltage switches one arc flash label shall be provided
- E. Labels shall be field installed by the engineering service division of the equipment manufacturer under the Startup and Acceptance Testing contract portion.

3.03 ARC FLASH TRAINING

- A. The equipment vendor shall train personnel of the potential arc flash hazards associated with working on energized equipment (minimum of 4 hours). Maintenance procedures in accordance with the requirements of NFPA 70E, Standard For Electrical Safety Requirements For Employee Workplaces, shall be provided in the equipment manuals. The training shall be certified for continuing education units (CEUs) by the International Association for Continuing Education Training (IACET).



WARNING

ARC FLASH HAZARD

LABEL # 0001

LINE SIDE **FLASH PROTECTION BOUNDARY: 40 inches**
of MAIN **HAZARD RISK CATEGORY: CLASS 2**
 INCIDENT ENERGY RANGE: 4 – 8 cal/cm²

LOAD SIDE **FLASH PROTECTION BOUNDARY: 20 inches**
of MAIN **HAZARD RISK CATEGORY: CLASS 0**
 INCIDENT ENERGY RANGE: 0 – 2 cal/cm²

PSE TQS#: #####.#

Date Issued: April 2004

Study Rev.: 0

LOCATION: BUS NAME

PROTECTIVE DEVICE: UPSTREAM DEVICE

END OF SECTION

SECTION 26 0810
ELECTRICAL ACCEPTANCE TESTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section Includes:
 - 1. Testing, evaluation and calibration of equipment provided, installed and connected in Division 26.
 - 2. Evaluation of connection and normal operation of utilization equipment, provided in other Divisions, for installation and connection in Division 26.
- B. Related Work:
 - 1. Section 26 0519, LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES.
 - 2. Section 26 2816, ENCLOSED SWITCHES AND CIRCUIT BREAKERS.
 - 3. Section 26 0526, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.
 - 4. Section 26 2200, LOW VOLTAGE TRANSFORMERS.
 - 5. Section 26 2416, PANELBOARDS.
 - 6. Section 26 0573, OVERCURRENT PROTECTIVE DEVICE COORDINATION.
 - 7. Section 26 3623, AUTOMATIC TRANSFER SWITCHES.
 - 8. Section 26 3213, ENGINE GENERATOR.

1.03 REFERENCES

- A. Acceptance Testing Criteria: Latest edition of Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems, published by IETA.
- B. Applicable Codes, Standards and References:
 - 1. National Electrical Code (NEC).
 - 2. National Electrical Manufacturer's Association (NEMA).
 - 3. American Society for Testing and Materials (ASTM).
 - 4. Institute of Electrical and Electronic Engineers (IEEE).
 - 5. International Electrical Testing Association (IETA).
 - 6. American National Standards Institute (ANSI).
 - 7. State and local codes and ordinances.
 - 8. Insulated Power Cable Engineers Association (IPCEA).
 - 9. Association of Edison Illuminating Companies (AEIC).
 - 10. OSHA Part 1910; Subpart S, 1910.308.
 - 11. National Fire Protection Association (NFPA).

1.04 SYSTEM DESCRIPTION

- A. Performance Requirements:
1. Retain the services of a recognized independent testing firm for the purpose of performing inspections and tests as specified herein.
 2. Independent test firm providing report direct to Architect.
 3. All material, equipment, labor and technical supervision to perform tests and inspections provided by testing firm.
 4. It is the intent of these tests to assure that all electrical equipment, Contractor or Owner supplied, is operational within industry and manufacturer's tolerances and is installed in accordance with design Specifications.
 5. Tests and inspections determine suitability for energization.
 6. Supply to the independent testing organization complete sets of approved shop drawings, coordination study (provided by Contractor's equipment supplier under Contractor's direction, setting of all adjustable devices and other information requested by testing agency).
- B. Scope of Testing, Evaluation and Calibration:
1. Power transformers.
 2. Distribution transformers.
 3. Low voltage circuit breakers (greater than 100 amp).
 4. Medium voltage circuit breakers.
 5. Metal enclosed switchgear.
 6. Switchboards.
 7. Ground fault protective signaling.
 8. Protective relays and associated instrument transformers.
 9. Medium voltage cables.
 10. Bus duct.
 11. Grounding systems.
 12. Motor control centers.
 13. Generators.
 14. Automatic transfer switches.

1.05 SUBMITTALS

- A. Test Reports:
1. Maintain written record of all tests.
 2. At completion of project, assemble and certify a final test report. Submit report to Architect prior to final acceptance to include:
 - a. Summary of project.
 - b. Description of equipment tested.
 - c. Visual inspection report.
 - d. Description of tests.
 - e. Test results.
 - f. Conclusions and recommendations.

1.06 QUALITY ASSURANCE

- A. Qualifications of Testing Firm:
1. Corporately independent testing organization which can function as an unbiased testing authority, professionally independent of the manufacturers, suppliers and installers of equipment or systems evaluated by testing firms.
 2. Independent organization as defined by OSHA Title 29, Part 1936 and IETA.
 3. Regularly engaged in the testing of electrical materials, devices, appliances, electrical installations and systems for the purpose of preventing injury to persons or damage to property and other equipment.
 4. Engaged in testing practices for minimum of 2 years.
 5. Use only full-time technicians, regularly employed by firm for testing services. Electrically unskilled employees are not permitted to perform testing or assistance of any kind. Electricians and line workers may assist, but may not perform testing or inspection services.
 6. Submit proof of above qualifications with Bid Documents.
- B. Certifications:
1. Comply with OSHA criteria for accreditation of testing laboratories, Title 29, Parts 1907, 1910 and 1936. Full membership in the IETA constitutes proof of such criteria.
 2. Lead, on site, technical person currently certified by IETA in Electrical Power Distribution System Testing.
 3. All instruments used by testing firm to evaluate electrical performance meet IETA Specifications for Test Instruments.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 FIELD QUALITY CONTROL

- A. Tests:
1. Contractor's Responsibilities:
 - a. Perform routine insulation resistance, continuity and rotation tests for all distribution and utilization equipment prior to and in addition to tests performed by testing firm.
 - b. Notify the testing firm when equipment becomes available for acceptance tests. Coordinate work to expedite project scheduling.
 2. Testing Firm's Responsibilities:
 - a. Notify Architect prior to commencement of any testing.
 - b. Report directly to Architect any systems, material or installation found defective on the basis of acceptance tests.
 - c. Provide auxiliary portable power supply necessary for conducting tests.

3.02 ADJUSTING

- A. Final Settings: Testing firm responsible for implementing all final settings and adjustments on protective devices and tap changes in accordance with Architect's specified values.

END OF SECTION

SECTION 26 0900
CONTROLS AND INSTRUMENTATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section Includes:
 - 1. Control devices, shown on the drawings and/or required by other sections, to assure a complete and operating system.
 - 2. Furnish submittals/shop drawings for all equipment in this section as described in Section 26 0500, 1.4, COMMON WORK RESULTS FOR ELECTRICAL.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Terminal and Control Cabinets shall be manufactured from code gauge galvanized steel with hinged locking covers finished in grey or hammer tone enamel. Knockouts, barriers and plywood backing shall be provided where required. Cabinets shall be of raintight construction where exposed to the weather. Approved manufacturers are Circle AW, Wireguard, Benner-Nawman, or equal.
- B. Photocontrols and time switches shall be provided as indicated on the drawings. Approved manufacturers are Intermatic, Paragon, Tork or equal. Where indicated on the fixture schedule, photocells in outdoor fixtures shall be factory installed and wired.
- C. Lighting Contactors shall be of the correct number of poles with suitable contact ampere ratings. Provide fusing protection for all lighting contactor control circuits. Verify all coil voltages prior to installation. Approved manufacturers are General Electric, Westinghouse, Square "D" or equal.
- D. Motor Controls shall be manual or magnetic with motor overload thermal relays. Individual thermal elements sized to the correct motor full load amps shall be used. Provide correct NEMA rated enclosure. Select proper voltage, class, size and horsepower rating. Select the correct coil voltage if magnetic.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Power to all irrigation controllers shall be provided by the Electrical Contractor as required for the irrigation equipment. Also provide and install conduit sweeps as required to house low voltage wiring between controller and exterior below grade.
- B. General Purpose Control Contactors shall be rated for the use with the correct ampere rating, voltage, size and horse power rating. Select the correct control coil voltage.

END OF SECTION

SECTION 26 2413
SERVICE AND DISTRIBUTION SWITCHBOARD

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section Includes:
 - 1. Service and distribution switchboard where shown on the contract drawings and specified herein.

1.03 QUALITY ASSURANCE

- A. Conform to applicable Codes and NEMA, ANSI and IEEE Standards.

1.04 SUBMITTALS

- A. Conform to applicable provisions of Section 01 33 00 of Division 01, Submittals and of Section 26 0500, COMMON WORK RESULTS FOR ELECTRICAL.
- B. Shop Drawings shall show and contain the following information:
 - 1. Plans showing top and bottom of switchboards.
 - 2. Front, rear and side elevations of switchboards.
 - 3. Schematic Wiring Diagrams showing the following:
 - a. One-line diagram with each circuit numbered.
 - b. Schedule showing circuit number, description and rating of protective device(s).
 - c. Complete short circuit with standability of bus.
 - 4. One-half inch equal to one-foot scale drawings of electrical rooms or areas overall dimensions for equipment layout including space available for conduits and protective devices.
- C. Manufacturer shall provide certification that the equipment supplied under this Section has been reviewed and certified by IBC to meet the current criteria for special seismic certification. Include seismic companion anchorage requirements from the testing and as approved by the manufacturer. The manufacturer shall provide an approved label on the equipment enclosure stating that the equipment has been awarded a certificate of compliance for special seismic certification.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Each switchboard shall be U.L. listed deadfront, deadrear, completely self-supporting, with the required number of vertical sections bolted together to form one floorstanding switchboard. Construction shall be NEMA Class II with line and load and main bus connections accessible from the front. Provide switchboards of 1000 amperes or greater rating with line and load insulated bus bars. Overcurrent protective devices shall be grouped in convertible type construction. Vertical sections shall have full height bussing and where space for future devices is indicated on the Drawings all the necessary mounting hardware shall be furnished. Switchboards shall include all protective devices and other equipment indicated on the Contract Drawings with the necessary interconnections, instrumentation, and control wiring. Bus shall be copper with plated joints, or tin plated aluminum. Bus bars shall be mounted on supports of high impact-resistant, non-tracking insulating material, and braced to withstand the maximum available fault current as indicated on the Contract Drawings. Other ratings shall be as indicated on the Contract Drawings. Series-connected or "integrated equipment" short circuit ratings shall not be applied in lieu of, or to comply with, short circuit and interrupting capacity ratings indicated on the Drawings, unless specifically approved by the Engineer.
- B. Service and distribution sections shall contain circuit breakers, fusible switches, and combination motor starters, with shunt trips, motor operators, ground fault protection, and other accessories, as indicated on the Drawings, as well as provisions for utility metering in accordance with the serving electric utility requirements. Each disconnecting means shall be provided with a means for individual padlocking. Switches shall be heavy-duty, quick-make and quick-break, and horsepower rated through 500 HP. Switches rated over 600 amperes shall be bolted pressure contact type. Ratings of disconnecting means and overcurrent protective devices shall be as indicated on the Drawings.
- C. Finish: Interior finish shall be a gray lacquer or enamel; exterior finish shall be a gray baked-on enamel or lacquer. Apply all finish coatings over a rust-inhibiting metal primer.
- D. Identification: Each switchboard shall have an engraved laminated plastic nameplate identifying the switchboard as designated and located on the Contract Drawings, and indicating voltage, phase, and number of system conductors. For example, "Switchboard MS 277/480V. 3Ø 4W. Lettering shall be white on black finish and 2" high minimum. Nameplates shall be affixed by a minimum of two escutcheon pins or screws. Each device on the switchboard shall be provided with an engraved plastic nameplate as specified in Section 26 0553, IDENTIFICATION OF ELECTRICAL SYSTEMS.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION

- A. Switchboard(s) shall be securely bolted to the flooring or structure. Final attachment means shall be in compliance with the seismic requirements of governing authority. Shop Drawings indicating the bolt down requirements shall be provided by the manufacturer along with all

necessary calculations and shall be submitted with the Shop Drawings of the switchboard equipment. Refer to other Sections of the Specifications related to seismic requirements.

- B. Switchboard(s) shall be installed on a level floor, with shims provided where necessary to attain both horizontal and vertical "plumb" conditions.
- C. Switchboard(s) equipment shall be protected during construction in such a manner to prevent plaster, paint, dust, etc. from defacing the finish of equipment. Prior to final acceptance of the equipment, the interior of the equipment shall be cleaned of all foreign materials and debris. Any blemishes or defects on the exterior of the equipment shall be repaired by painting the equipment with paint supplied by the manufacturer of the equipment to match the factory finishes.
- D. All floor mounted switchgear and panelboards shall be sealed with caulking between bottom of metal housing and the concrete pad or slab to prevent entrance of dust and debris.
- E. All openings in switchgear and panelboards that are unused shall be sealed with bolts and washers. Use caulking where holes or openings cannot be sealed by way of a washer, or bolts or conduit seals.
- F. All ventilated openings in panelboards and switchboards shall be furnished with dust filters to prevent entrance of dust and debris.
- G. No operating handles in any switchboard shall be located above 6'- 6" above finish floor. Code clearances on all sides of the switchboard equipment shall be maintained.
- H. Switchboards shall be mechanically grounded to the grounding system.
- I. Furnish ammeters, voltmeters, current and potential transformers, test blocks, control switches, fuses and circuit breakers, and other devices as indicated on the Drawings. Meters shall be switchboard type semi-flush mounted, with phase selector switches. The height of all devices shall comply with Code and utility company requirements with the switchboard installed on a 2" high concrete pad.
- J. For solidly grounded "wye" services of more than 150 volts to ground, but not exceeding 600 volts phase to phase, provide ground fault protection of equipment for each service disconnecting means for services rated 1000 amperes or more, without a single main disconnecting means. Provide ground fault protection of equipment for other systems as indicated on the Drawings.
- K. Ground fault sensors shall be zero sequence type unless indicated otherwise on the drawings. Trip settings shall be as indicated on the drawings or as directed by the Engineer.
- L. Protection: Keep switchboards covered during construction operations. Clean interior and exterior after all connections are completed. Factory connections shall be checked and re-torqued tight as required. Damage shall be field or factory repaired to a condition acceptable to the Engineer at no added cost to the Owner.
- M. Operational Test of the ground fault protection system using the primary current injection method shall be performed by qualified personnel with suitable testing/recording equipment in

the presence of the Owner. Provide the Owner with a "Certified Test Report" including test parameters.

3.02 ACCEPTANCE TESTING OF SWITCHGEAR AND SWITCHBOARD ASSEMBLIES

A. General:

1. Inspect for physical damage.
2. Compare equipment nameplate information with latest single line diagram and report discrepancies.
3. Inspect for proper alignment, anchorage and grounding.
4. Check tightness of accessible bolted bus joints by calibrated torque wrench method. Refer to manufacturer's instruction for proper foot pound levels.
5. Key interlock systems shall be physically tested to insure proper function.
 - a. Closure attempt shall be made on locked open devices. Opening attempt shall be made on locked closed devices.
 - b. Key exchange shall be made with devices operated in off-normal positions.
6. All doors, panels and sections shall be inspected for paint, dents, scratches.

END OF SECTION

SECTION 26 2416
PANELBOARDS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section Includes:
1. Panelboards.
 2. Manufacturer shall provide certification that the equipment supplied under this Section has been reviewed and certified by IBC to meet the current criteria for special seismic certification. Include seismic companion anchorage requirements from the testing and as approved by the manufacturer. The manufacturer shall provide an approved label on the equipment enclosure stating that the equipment has been awarded a certificate of compliance for special seismic certification.
- B. Related Work:
1. Division 09 "PAINTING": Identification and painting of panelboards.
 2. Section 26 0500, COMMON WORK RESULTS FOR ELECTRICAL.
 3. Section 26 0573 OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY: Requirements for the over current protective devices to be installed to ensure proper equipment and personnel protection.
 4. Section 26 0533, RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS.
 5. Section 26 0519, LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW): Cables and wiring.
 6. Section 26 0526, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path for possible ground fault currents.

1.03 APPLICABLE PUBLICATIONS

- A. Publications listed below (including amendments, addenda, revisions, supplements and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.
- B. Underwriters Laboratories, Inc. (UL):
1. No. 50-1995 Enclosures for Electrical Equipment
 2. No. 67-1993 Panelboards
 3. No. 489-1991 Molded Case Circuit Breakers and Circuit Breaker enclosures
- C. National Fire Protection Association (NFPA):

1. No. 70-2010 California Electrical Code (CEC)
- D. National Electrical Manufacturers Association (NEMA):
 1. No. PB-1-2002 Panelboards.
 2. No. AB-3-1996 Molded Case Circuit Breakers and Their Application.

PART 2 - PRODUCTS

2.01 PANELBOARDS

- A. Panelboards shall be in accordance with UL, NEMA, NEC, CEC and as shown on the drawings. Approved manufacturers are Cutler Hammer, Square D, Seimens, General Electric.
- B. Panelboards shall be standard manufactured products. All components of the panelboards shall be the product and assembly of the same manufacturer. All similar units of all panelboards to be of the same manufacturer.
- C. All panelboards shall be dead front safety type. Arrange sections for easy removal without disturbing other sections.
- D. All panelboards shall be completely factory assembled with molded case circuit breakers. All factory wiring shall be checked for correct tightness and visually inspected to insure that bussing and terminations have not become loose in transit to job site.
- E. Panelboards shall have main breaker or main lugs, bus size, voltage, phase, top or bottom feed, and flush or surface mounting as scheduled on the drawings. Refer to single line diagram and panel schedules on drawings. Terminals shall be minimum 75 degree rated. Back fed main circuit breakers are not allowed. Main circuit breakers shall be vertically mounted.
- F. Panelboards shall have the following features:
 1. Nonreduced size copper bus bars, and connection straps bolted together and rigidly supported on molded insulators. Bus bar taps for panels with single pole branches shall be arranged for sequence phasing of branch circuit devices.
 2. Full size neutral bar, mounted on insulated supports.
 3. Ground bar and isolation ground bar (where called for in panel schedule) with sufficient terminals for all grounding wires. Buses braced for the available short circuit current.
 4. All breakers and phase bus connections shall be arranged so that it will be possible to substitute a 2-pole breaker for two single pole breakers, and a 3-pole breaker for three single pole breakers, when trip is 30 amps or less and frame size is 100 amperes or less, without having to drill and tap the main bus bars at bus straps. Where used for heating and air conditioning, and refrigeration equipment, use only HACR type U.L. listed circuit breakers.
 5. Design interior so that protective devices can be replaced without removing adjacent units, main bus connectors, and without drilling or tapping.
 6. Where designated on panel schedule as "space", include all necessary bussing, device support and connections. Provide blank cover for each space.

7. In two section panelboards, the main bus in each section shall be full size. The first section shall be furnished with subfeed lugs on the line side with cable connections to the second section. Panelboard sections with tapped bus or crossover bus are not acceptable.
 8. Series rated panelboards are not permitted.
 9. Label all panels in accordance with Section 26 0553, IDENTIFICATION OF ELECTRICAL SYSTEMS.
 10. Recessed panel space conduit: Provide (1) ¾ inch spare conduit stubbed to accessible ceiling space and/or interstitial space below floor for every (5) spaces and spares indicated on panel schedules.
- G. Panelboards serving as building mains shall be “service entrance rated” and UL Listed as “service equipment”.

2.02 CABINETS AND TRIMS

- A. Cabinets:
1. Provide galvanized steel cabinets to house panelboards. Cabinets for outdoor panels shall be factory primed and suitably treated with a corrosion-resisting paint finish meeting UL standard for outdoor applications.
 2. All ventilated openings in panelboards and switchboards, shall be furnished with dust filters to prevent entrance of dust and debris.
 3. Cabinets for panelboards may be of one piece formed steel or of formed sheet steel with end and side panels welded, riveted, or bolted as required.
 4. Provide necessary hardware for "in" and "out" adjustment of panel interior.
 5. Cabinets for two section panelboards shall be arranged side by side, and shall be the same height. Flush mounted cabinets should be 1 1/2" apart and coupled by conduit nipple if necessary.
 6. Gutter size in panel boxes, on all sides, shall be in accordance with the CEC. Penetrations through gutter to live area of the panelboard shall incorporate approved non-metallic-grommet type of insulation to protect wire passing through.
- B. Trims:
1. Fabricate trim of sheet steel consisting of frame with door attached by concealed hinges. Provide flush or surface trim as shown on the drawings.
 2. Flush trims shall overlap the box by at least 3/4" all around.
 3. Surface trim shall have the same width and height as the box.
 4. Flush or surface trims shall not have ventilating openings.
 5. Secure trims to back boxes by indicating trim clamps.
 6. Provide a welded angle on rear of trim to support and align trim to cabinet.
 7. Provide separate trims for each section of multiple section panelboards. Trims and doors of sections shall be of the same height.
- C. Doors:
1. Provide doors with flush type latch and manufacturer's standard lock. Doors over 48 inches in height shall have a vault handle and a three-point catch, arranged to fasten door at top, bottom, and center.
 2. In making switching devices accessible, doors shall not uncover any live parts.
 3. Provide concealed hinges welded to the doors and trims.

4. For lighting or power contactors incorporated in panelboards, provide separate doors for the contactors.
 5. Provide keyed alike system for all panelboards.
 6. Provide a directory card, metal holder, and transparent cover. Permanently mount holders on inside of doors.
- D. Painting:
1. Thoroughly clean and paint trims and doors at the factory with primer and manufacturer's standard finish.

2.03 MOLDED CASE CIRCUIT BREAKERS FOR PANELBOARDS

- A. Breakers shall be UL listed and labeled, in accordance with the CEC, as shown on the drawings, and as specified.
- B. Circuit breakers in panelboards shall be bolt on type on phase bus bar or branch circuit bar.
1. Molded case circuit breakers for lighting and appliance branch circuit panelboards shall have minimum interrupting rating as indicated or as dictated by Section 26 0573 OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY.
 2. Molded case circuit breakers shall have automatic, trip free, non-adjustable, inverse time, and instantaneous magnetic trips for 100 ampere frame or less. Magnetic trip shall be adjustable from 3 times to 10 times for breakers with 600 ampere frames and higher. Factory setting shall be HI, unless otherwise noted.
- C. Breaker features shall be as follows:
1. Integral housing of molded insulating material.
 2. Silver alloy contacts.
 3. Arc quenchers and phase barriers for each pole.
 4. Quick-make, quick-break, operating mechanisms.
 5. A trip element for each pole, thermal magnetic type with long time delay and instantaneous characteristics, a common trip bar for all poles and a single operator.
 6. Electrically and mechanically trip free.
 7. An operating handle which indicates ON, TRIPPED, and OFF positions.
 - a. Line connections shall be bolted.
 - b. Interrupting rating shall not be less than the maximum short circuit current available at the line terminals as indicated on the drawings, and as shown on the electrical system protective device study as required in Section 26 0573 OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY. The interrupting rating shall not be less than the minimum identified requirement.
 8. An overload on one pole of a multipole breaker shall automatically cause all the poles of the breaker to open.

2.04 SEPARATELY ENCLOSED MOLDED CASE CIRCUIT BREAKERS

- A. Where separately enclosed molded case circuit breakers are shown on the drawings, provide circuit breakers in accordance with the applicable requirements of those specified for panelboards.

- B. Enclosures are to be of the NEMA types shown on the drawings. Where the types are not shown, they are to be the NEMA type most suitable for the environmental conditions where the breakers are being installed.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Installation shall be in accordance with CEC, as shown on the drawings, and as specified.
- B. Locate panelboards so that the present and future conduits can be conveniently connected. Coordinate the sizes and layout of cabinets within the designated spaces. All equipment must be dimensioned in order to physically fit in the spaces provided and to comply with all code required clearances.
- C. Install a typewritten schedule of circuits in each panelboard. Include the room numbers (as finally described by the Owner) and items served on the cards. Obtain final room numbers from Architect prior to creating schedule.
- D. Mount the panelboard so that maximum height of the top circuit breaker above finished floor shall not exceed 78 inches.
- E. For panelboards located in areas accessible to the public, paint the exposed surfaces of the trims, doors, and boxes with finishes to match surrounding surfaces after the panelboards have been installed.
- F. Circuit numbers shall correspond to the approved panel schedule. Provide as-built drawings showing the actual circuit numbers being used for each device on each branch circuit if changes are required.
- G. Verify depth of all flushmounted enclosures in walls to be certain wall depth will accommodate panel depth prior to installation.
- H. All openings in switchgear and panelboards that are unused shall be sealed with bolts and washers. Use caulking where holes or openings cannot be sealed by way of a washer, or bolts or conduit seals.
- I. Contractor shall include the services of an independent testing company to test GFI circuit breakers in distribution and main panelboards.

END OF SECTION

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SECTION 26 2726
WIRING DEVICES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section Includes:
 - 1. Wiring devices.
- B. Related Work:
 - 1. Section 26 0500, COMMON WORK RESULTS FOR ELECTRICAL.
 - 2. Section 26 0533, RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS.
 - 3. Section 26 0519, LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES.
 - 4. Section 26 0526, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.

PART 2 - PRODUCTS

2.01 RECEPTACLES

- A. General: All receptacles shall be listed by Underwriters Laboratories, Inc.
 - 1. Mounting straps shall be plated steel, with break-off plaster ears and shall include a self-grounding feature (this feature does not substitute for a grounding conductor terminated on grounding strap of device). Terminal screws shall be brass, brass plated or a copper alloy metal.
 - 2. Receptacles shall be of a screw terminal type, "pressure type quick wire" terminations are not allowed.
- B. Duplex receptacles shall be style line/decora single phase, 20 ampere, 120 volts, 2-pole, 3-wire, and conform to the NEMA 5-20R configuration in NEMA WD 6. The duplex type shall have bussing break-off feature for two-circuit operation. The ungrounded pole of each receptacle shall be provided with a separate terminal.
 - 1. Wiring device color selection to be provided by Architect. Contractor to verify device color with Architect prior to procurement.
 - 2. Switched duplex receptacles shall be wired so that only the top receptacle is switched. The remaining receptacle shall be unswitched.
 - 3. Ground Fault Interrupter Duplex Receptacles: Shall be an integral unit suitable for mounting in a standard outlet box.

- a. Ground fault interrupter shall be commercial grade and consist of a differential current transformer, solid state sensing circuitry and a circuit interrupter switch. It shall be rated for operation on a 60 Hz, 120 volt, 20-ampere branch circuit. Device shall meet CEC requirements. Device shall have a minimum nominal tripping time of 1/30th of a second. Devices shall meet UL 943.
- C. Receptacles; 20, 30 and 50 ampere, 250 volts: Shall be complete and match with appropriate cord grip plug. Devices shall meet UL 231.
- D. Weatherproof Receptacles: Shall consist of a listed weather resistant duplex receptacle, mounted in box with a gasketed, while in use weatherproof, cast metal cover plate and cap receptacle opening. The cap shall be permanently attached to the cover plate by a spring-hinged flap. Approved manufacturers: Intermatic WP10 Series, Thomas & Betts/Red Dot 2CK Series, or engineer approved equal.

2.02 SWITCHES AND DIMMERS

- A. Style line/decora rocker switches shall be totally enclosed tumbler type with bodies of phenolic compound. Toggle handles color to match receptacle device color unless otherwise specified.
 - 1. Shall be single unit toggle, butt contact, quiet AC type, heavy-duty general-purpose use with an integral self grounding mounting strap with break-off plaster ears and be of a screw terminal type.
 - 2. Shall be color coded for current rating, listed by Underwriters Laboratories, Inc., and meet the requirements of NEMA WD 1, Heavy-Duty and UL 20.
 - 3. Ratings:
 - a. 120 volt circuits: 20 amperes at 120-277 volts AC.
 - b. 277 volt circuits: 20 amperes at 277 volts AC.
 - 4. The switches shall be mounted on the strike plate side of doors.
 - 5. Incorporate barriers between switches with multi-gang outlet boxes where required by the CEC.
 - 6. All toggle switches shall be of the same manufacturer.
- B. Dimmers: Incandescent lamp loads. Wall-mounted incandescent dimmers shall be specification grade with capability of raising and lowering the lighting from completely off to full intensity. Dimmers shall maintain full load rating even when two or more units are installed adjacent to one another. All wall-mounted dimmers shall be of the same manufacturer and of a "slide" type. Color shall match all other wiring devices on project.
- C. Dimmers: Fluorescent lamp loads. Wall-mounted fluorescent lamp dimmers shall be specification grade and shall be capable of raising and lowering the lighting from five percent light output. Dimmers shall have low end intensity adjustment and maintain full load rating even when two or more units are installed adjacent to one another. All wall-mounted dimmers shall be of the same manufacturer and of a "slide" type. Dimming ballast shall be provided for each lamp or pair of lamps. Dimmers shall have adequate capacity for the load served and the environment in which installed.

2.03 WALL PLATES

- A. Wall plates for switches and receptacles shall be type 302 stainless steel at App Bay, thermo plastic throughout.
- B. Standard NEMA design, so that products of different manufacturers will be interchangeable. Dimensions for openings in wall plates shall be accordance with NEMA WD1.
- C. For receptacles or switches ganged together, wall plates shall be a single ganged plate.
- D. Wall plates for data, telephone or other communication outlets shall be as specified in the associated specification.
- E. Surface mounted boxes, NEMA1, shall be industrial grade raised galvanized steel covers. In shop areas all receptacles shall be dust proof and or waterproof where applicable.
- F. Waterproof device covers shall be cast iron, 4-corner screw type, for FS and FD type mounting. Device covers shall be zinc galvanized finish. Weatherproof covers shall be lockable.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Switches installed in hazardous areas shall be explosion proof type in accordance with the CEC and as shown on the drawings.
- B. Installation shall be in accordance with the CEC, NECA "Standard of Installation", and as shown as on the drawings.
- C. Ground terminal of each receptacle shall be bonded to the outlet box with an approved green bonding jumper, and also be connected to the green equipment grounding conductor.
- D. General: Devices shall be of the type specified herein. All devices shall be installed with "pigtailed" leads from the outlet box. No device shall be used in the "feed through" application. Screw terminals shall be used to connect all devices to the circuit and shall be grounded by means of a ground wire where grounding terminals are provided in the device.
- E. Installation: Devices and plates shall be installed in a "plumb" condition and must be flush with the finish surface of the wall where boxes are recessed.
- F. Mounting heights: All control and convenience devices shall comply with California Code of Regulations Title 24 and ADA with respect to accessibility requirements. Mounting heights indicated on plans shall have precedence.
- G. Install switches with the off position down.
- H. Clean debris from outlet boxes.

- I. Provide extension rings as required to bring outlet boxes flush with finished surface or casework.
- J. Test each receptacle device for proper polarity.

END OF SECTION

SECTION 26 2816
ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section Includes:
 - 1. Disconnect and safety switches where shown on the contract drawings and specified herein.
- B. Related Work:
 - 1. Section 26 0553, IDENTIFICATION OF ELECTRICAL SYSTEMS.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Approved Manufacturers: Cutler Hammer, General Electric, ITE-Siemens and Square-D.
- B. Disconnect Switches: Provide with devices enabling the switch to be locked in the open or closed positions.
- C. Manual Motor Switches: Tumbler type rated 3HP, 240 Volts with or without overload heaters as required to protect equipment served.
- D. Externally Operable Safety Switches: To have quick-make, quick-break mechanism, capable of switching 10 times switch rating, with cover interlock to prevent opening with switch in ON position and defeat mechanism for maintenance.
- E. Switches: Shall be general duty (GD) for 240 volt and below and heavy duty (HD) for 277/480 volt type unless otherwise indicated. Provide NEMA 1 enclosures for interior locations and NEMA 3R enclosures for exterior or wet locations. Provide with number of poles, ampacity, voltage and HP rating, fusible or nonfusible as indicated. Copper blades shall be visible in off position.
- F. Fusible Switches: Equip them with rejection clips for UL Class R fuses. Switches having a dual rating when used with dual element fuses shall have a rating so indicated and shall be confirmed by equipment vendor being connected.
- G. 600 Amperes or Less Fuses: UL Class RKI with a minimum interrupting rating of 200,000 Amperes, Bussmann "Low-Peak Type" or equal.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION

- A. Locations: Install switches, disconnects and safety where indicated on the Contract Drawings or as required by CEC.
- B. Fastenings: Securely fasten switches to structural members or unistrut support as directed by the manufacturer.
- C. Manual Motor Switches: Install flush mounted in finished areas.
- D. Manual Motor Switches: Install surface mounted in equipment rooms and non-finished areas. Where installed above inaccessible ceilings provide access panels.
- E. Label all disconnect switches in accordance with Section 26 0553, IDENTIFICATION OF ELECTRICAL SYSTEMS.
- F. Fuse: All fuses shall be as indicated on the plan or as required by the equipment. Verify fuse size with equipment manufacturer requirements, prior to installation. Use current limiting fuses as indicated on plan. Provide one spare fuse cabinet in each electrical room with one complete set of spare fuses for all sizes of main fuses, subpanel fuses, HVAC equipment fuses and fire alarm.
- G. Terminals shall be minimum 75 degree rated.

END OF SECTION

SECTION 26 3213
GENERATOR SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Applicable Codes and Standards:
 - 1. 2019 California Building Code (CBC).
 - 2. 2019 California Mechanical Code (CMC).
 - 3. 2019 California Electrical Code (CEC). Specifically, CEC Articles 517, 700, 701, 702.
 - 4. 2019 California Fire Code (CFC) Only if 12 ft. vent pipe required.
 - 5. 2019 NFPA 99 – Health Care Facilities Code. (2005 NFPA 99 (Testing)).
 - 6. 2019 NFPA 30 – Flammable and Combustible Liquids Code.
 - 7. 2019 NFPA 37 – Installation and Use of Stationary Combustion Engines.
 - 8. 2019 NFPA 55 – Compressed Gases and Cryogenic Fluids Code.
 - 9. 2019 NFPA 110 – Emergency and Standby Power Systems. (NFPA 110 (Testing)).
 - 10. UL 2200 – Standard for Safety of Stationary Engine Generator Assemblies.
 - 11. U.S. EPA – New Source Performance Standards.
 - 12. International Standards Organization, ISO 9001.

1.02 REQUIREMENTS OF REGULATORY AGENCIES

- A. An electric generating system or Emergency Power Supply (EPS), consisting of a prime mover, generator, governor, coupling and controls, must have been tested, as a complete unit, on a representative engineering prototype model of the equipment to be sold.
- B. The generator set must conform to applicable California Electrical Code and applicable authorities having jurisdiction including DSA and CSFM.
- C. The generator set must be available with the Underwriters Laboratories listing (UL 2200) as a stationary engine generator assembly.
- D. The generator shall meet all of the following standards: The generator set shall be EPA and CARB Emissions Certified for non-road applications and meet all local emission standards and requirements. It shall meet all local County or Regional APCD requirements.
- E. The generator control and remote annunciation shall be compatible with the transfer microprocessor based logic controller integrated in the main switchboard. The transfer controller shall communicate through open protocol to energy management system or data network to provide remote status indication.

1.03 MANUFACTURER QUALIFICATIONS

- A. This system shall be supplied by CUMMINS OR CATERPILLAR per City requirements.

- B. Manufacturer shall provide certification that the equipment supplied under this Section has been reviewed and certified by IBC to meet the current criteria for special seismic certification. Include seismic companion anchorage requirements from the testing and as approved by the manufacturer.

1.04 UNIT TESTING

- A. Before shipment of the equipment, the engine-generator set shall be tested under rated load and rated power factor for performance and proper functioning of control and interfacing circuits. Tests shall include:
 - 1. Verifying all safety shutdowns are functioning properly.
 - 2. Verify single step load pick-up per NFPA 110 Paragraph 7.13.7.
 - 3. Verify transient and voltage dip responses and steady state voltage and speed (frequency) checks.
 - 4. Submit the certification of the factory test, including recorded ambient temperature, altitude, and fuel grade.

1.05 SUBMITTALS

- A. Owner's Manuals: provide three (3) sets of owner's manuals specific to the product supplied must accompany delivery of the equipment. General operating instruction, preventive maintenance, wiring diagrams, schematics and parts exploded views specific to this model must be included.
- B. Submittals: Provide complete sets of Engineering Submittal for approval, prior to production release, showing all components, in addition to the engine and generator. Submittals shall include compliance with these specifications. Refer to general requirements for quantities of submittals and additional requirements.

1.06 WARRANTY

- A. Warranty: The standby electric generating system components, complete engine-generator and instrumentation panel shall be warranted by the manufacturer against defective materials and factory workmanship for a period of 5 years. Such defective parts shall be repaired or replaced at the manufacturer's option, free of charge. Travel and labor shall be included for the first 36 months. The warranty period shall commence when the standby power system is placed into service and accepted by the Owner or Owner's Representative. Multiple warranties for individual components (engine, alternator, controls, etc.) will not be acceptable. Satisfactory warranty documents must be provided. Also, in the judgment of the specifying engineer, the manufacturer supplying the warranty for the complete system must have the necessary financial strength and technical expertise with all components supplied to provide adequate warranty support.
- B. Provide supplier one-year maintenance service for the generator after the final acceptance.

1.07 SERVICE CONTACT

- A. Service: Supplier of the electric plant and associated items shall have permanent service facilities in this trade area. These facilities shall comprise a permanent force of factory trained

service personnel on 24 hour call, experienced in servicing this type of equipment, providing warranty and routine maintenance service to afford the owner maximum protection. Delegation of this service responsibility for any of the equipment listed herein will not be considered fulfillment of these specifications. Service contracts shall also be available.

PART 2 - ENGINE-GENERATOR SET

2.01 ENGINE

- A. The prime mover shall be a liquid cooled, diesel fueled, naturally aspirated engine of 4-cycle design with a minimum of 6 cylinders. The unit requires a minimum rated output per single line diagram at an operating speed of 1800 RPM.
- B. The engine is to be cooled with a unit mounted radiator, fan, water pump, and closed coolant recovery system providing visual diagnostic means to determine if the system is operating with a normal engine coolant level. The radiator shall be designed for operation in 110 degrees f, 43 degrees c ambient temperature.
- C. The intake air filter(s) with replaceable element must be mounted on the unit. Full pressure lubrication shall be supplied by a positive displacement lube oil pump. The engine shall have a replaceable oil filter(s) with internal bypass and replaceable element(s). Engine coolant and oil drain extensions, equipped with pipe plugs, must be provided to outside of the mounting base for cleaner and more convenient engine servicing. A fan guard must be installed for personnel safety.
- D. The engine shall have a battery charging DC alternator with a transistorized voltage regulator. Remote 2-wire starting shall be by a solenoid shift, electric starter.
- E. Engine speed shall be controlled by isochronous governor to maintain alternator steady state frequency within 0.25% from no load to full load alternator output. Steady state regulation is to be 0.5%.
- F. The engine fuel system shall be designed for operation using No. 2 diesel fuel. A primary fuel filter, water separator, manual fuel priming pump, fuel shutoff solenoid and all fuel lines must be installed at the point of manufacture.
- G. The primary diesel fuel filter shall be capable of removing contaminants of 10 microns. Element shall be replaceable paper type.
- H. The engine shall have (a) unit mounted, thermostatically controlled water jacket heater(s) to aid in quick starting. The wattage shall be as recommended by the manufacturer. The contractor shall provide proper branch circuit from normal utility power source.
- I. Sensing elements to be located on the engine for low oil pressure shutdown, high engine temperature shutdown, low coolant level shutdown, overspeed shutdown, overcrank shutdown, remote E-stop shutdown and air shutdown damper when used. These sensors are to be connected to the control panel using a wiring harness with the following features: wire number labeling on each end of the wire run for easy identification, a molded rubber boot to cover the electrical connection on each sensor to prevent corrosion and all wiring to be run in flexible conduit for protection from the environment and any moving objects.

- J. Provide the following items installed at the factory:
 - 1. The manufacturer shall supply its recommended stainless steel, flexible connector to couple the engine exhaust manifold to the exhaust system.

2.02 ALTERNATOR

- A. The alternator shall be a 4 pole revolving field type, 12 lead, wired for 120/208V 3 phase 4 wire, 60 hz, with a brushless exciter. Photosensitive components will not be permitted in the rotating exciter. The stator shall be direct connected to the engine to insure permanent alignment. The generator shall meet temperature rise standards for Class "H" insulation; operate within Class "F" standards for extended life. All leads must be extended into an AC connection panel. The alternator shall be protected by internal thermal overload protection and an automatic reset field circuit breaker.
- B. One step load acceptance shall be 100% of engine-generator set nameplate rating and meet the requirements of NFPA 110 Paragraph 7.13.7. The generator set and regulator must sustain at least 90% of rated voltage for 10 seconds with 250% of rated load at near zero power factor connected to its terminals when equipped with direct or brushless excitation. 300% short circuit current must be selectable on units equipped with permanent magnet exciters. Generators equipped with permanent magnet exciters not allowing the selection of the short circuit current ratings are not allowed.
- C. A solid state voltage regulator designed and built by the alternator manufacturer must be used to control output voltage by varying the exciter magnetic field to provide + or - 1% regulation during stable load conditions. Should an extremely heavy load drop the output frequency, the regulator shall have a voltage drop of 4 Volts/Hertz to maximize motor starting capability. The frequency at which this droop operation begins must be adjustable, allowing the generator set to be properly matched to the load characteristics insuring optimum system performance. Additional rheostats for matching generator voltage, droop, and stability characteristics to the specific load conditions must be available.
- D. A NEMA 1 panel that is an integral part of the generator set must be provided to allow the installer a convenient location in which to make electrical output connections. A fully rated, isolated neutral must be included by the generator set manufacturer to insure proper sizing.
- E. The electric plant shall be mounted with vibration isolators on a welded steel base that shall permit suitable mounting to any level surface.
- F. Provide the following items installed at the factory:
 - 1. A main line 600 amp, 3 pole, 600 volt rated, 100% rated molded case type, generator mounted circuit breaker carrying the UL mark shall be factory installed. The breaker shall be rated per the manufacturer's recommendations. Circuit breaker shall be mounted in the genset connection box. The line side connections are to be made at the factory. Output lugs shall be provided for load side connections. A system utilizing manual reset field circuit breakers and current transformers is unacceptable

2.03 CONTROLS

- A. All engine alternator controls and instrumentation shall be designed, built, wired, tested and shock mounted in a NEMA 1 enclosure to the engine-generator set by the manufacturer. It shall contain panel lighting, a fused DC circuit to protect the controls and a +/-5% voltage adjusting

control. This panel must be able to be rotated 90 degrees in either direction for correct installation.

- B. The engine-generator set shall contain a complete 2 wire automatic engine start-stop control which starts the engine on closing contacts and stop the engine on opening contacts. A cyclic cranking limiter shall be provided to open the starting circuit after eight attempts if the engine has not started within that time. Engine control modules must be solid state plug-in type for high reliability and easy service.
- C. The panel shall include; analog meters to monitor AC voltage, AC current and AC frequency with a phase selector switch, an emergency stop switch, an audible alarm, battery charger fuse, and a programmable engine control and monitoring module.
- D. The programmable module shall include: a manual, off, auto switch; four LEDs to indicate 1) Not In Auto, 2) Alarm Active, 3) Generator Running, 4) Generator Ready; a data entry keypad and a digital display panel.
- E. The module will display all pertinent unit parameters including:
 - 1. Generator Status
 - a. Current unit status in real time
 - 2. Instrumentation
 - a. Real time readouts of the engine and alternator analog values
 - 1) Oil pressure
 - 2) Coolant temperature
 - 3) Fuel level
 - 4) DC battery voltage
 - 5) Run time hours
 - 3. Generator Commands
 - a. Current engine start/stop status
 - 4. Alarm Status (Safety Indications and Shutdowns as required by NFPA 110 Table 5.6.5.2 for the level of EPS being installed)

LEVEL 1 SYSTEM (NFPA 99 T6.4.1.1.16.ref. designation)

- 1) Overcrank (a)
- 2) Low water temperature (b)
- 3) High engine temperature pre-alarm (c)
- 4) High engine temperature (d)
- 5) Low oil pressure pre-alarm (e)
- 6) Low oil pressure (f)
- 7) Overspeed (g)
- 8) Low fuel level main tank (h)
- 9) Low coolant level (i)
- 10) EPS supplying load (j)
- 11) Unit not in "Automatic Mode" (k)
- 12) High battery voltage (l)
- 13) Low cranking voltage (m)
- 14) Low battery voltage (n)
- 15) Battery charger AC failure (o)
- 16) Lamp test (p)
- 17) Contacts for local and remote common alarm (q)
- 18) Audible alarm silencing switch (r)
- 19) Low starting air pressure (when applicable) (s)

20)	Low starting hydraulic pressure (when applicable)	(t)
21)	Air shutdown damper when used	(u)
22)	Remote Emergency Stop	(v)
23)	High or low AC voltage	(-)
24)	High or low frequency	(-)
25)	High, low and critical low fuel levels	(-)
26)	*8 user programmable digital channels	(-)
27)	*4 user programmable analog channels	(-)
5. Alarm Log
- a. Memory of last fifty alarm events
6. Operating parameters
- a. Access to and manipulation of the current operating parameters and alarm limits
7. Software Information
- a. Version information and module display test function
- F. The panel must be accessible by PC based software via either standard RS232, RS485 or modem. The software must display the module face, be updated in real time and allow for complete access to all module functions. Communication output and its software must be fully compatible and allow for incorporation in the system control program.
- G. The following equipment is to be installed at the engine-generator set manufacturer's facility:
1. A DPDT relay shall be socket mounted in the generator control panel and operate on engine start and run for customer connection.
- H. The following equipment is to be provided by the engine-generator set manufacturer and shipped loose with the unit:
1. A (20) light remote annunciator panel flush mounted where shown on drawings.
2. A weather proof tamper resistant remote emergency power off (EPO/E-Stop) mushroom type push button labeled "Generator Emergency Stop".

2.04 UNIT ACCESSORIES

- A. The following equipment is to be installed at the engine-generator set manufacturer's facility:
1. Weather Protective Enclosure: The engine-generator set shall be factory enclosed in a Level I sound attenuated weather housing with a 74dB(A) at 23ft sound rating, weather proof housing. The enclosure is to have large, hinged doors to allow access to the engine, alternator and control panel. The doors must lift off without the use of tools. Each door will have stainless steel hinges and locking hardware with identical keys. Padlocks do not meet this specification. The exhaust silencer(s) shall be provided of the size as recommended by the manufacturer and shall be of critical grade. It shall be connected to the engine with a flexible, seamless, stainless steel exhaust connection. A rain cap will terminate the exhaust pipe. All components must be properly sized to assure operation without excessive back pressure when installed. Enclosure shall have an externally mounted emergency stop button.
2. A heavy duty, lead acid battery set rated at 90AH (27F) shall be installed by the generator set manufacturer. Provide all intercell and connecting battery cables as required.
3. Provide a 2 amp automatic float battery charger manufactured by the engine-generator set supplier. It is to be of a solid state design and self-regulating to prevent overcharging the system battery. The battery charger is to be factory installed on the generator set. Due to

line voltage drop concerns, a battery charger mounted in the transfer switch will be unacceptable.

- B. The following equipment is to be provided by the engine-generator set manufacturer and shipped loose with the unit:
 - 1. Spring type vibration isolators to mount between the mounting base and pad to reduce noise and transmitted vibrations shall be supplied by the manufacturer.
 - 2. Pad type vibration dampeners.
 - 3. Normal fuel venting kit to minimum 12 feet above grade, in compliance with CFC 3404.2.7.3.3.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Contractor shall install the complete electrical generating system including the indicated shipped-loose accessories and all fuel connections in accordance with the manufacturer's recommendations as reviewed by the Engineer.
- B. Contractor shall provide complete conduit infrastructure for power and low voltage/communications wiring to generator system and all accessories.

3.02 STARTUP AND CHECKOUT

- A. The supplier of the electric generating plant and associated items covered herein shall provide factory trained technicians to checkout the completed installation and to perform an initial startup inspection to include:
 - 1. Provide all required fluids (oil, coolant, lubricants, and fuel) and ancillary equipment for full function of the Emergency Power Supply.
 - 2. Ensuring the engine starts (both hot and cold) within the specified time.
 - 3. Verification of engine parameters within specification.
 - 4. Verify no load frequency and voltage, adjusting if required.
 - 5. Test all automatic shutdowns of the engine-generator.
 - 6. Perform a 4 hour load test of the electric plant, per NFPA 110 Section 7.13. Observe and record results of test in the presence of the AHJ / IOR. Provide a portable load bank, cables and connections as required to conform to testing requirements. Correct defects which become evident during this test. Supply fuel for test. Include the complete emergency system (consisting of generator, emergency distribution equipment and automatic transfer switches, and the like) in final test operations. Top off fuel tank at end of test.

7. Include 4 hour on-site meeting / training with Owner's representative prior to final acceptance. Schedule training with Owner (minimum) one week in advance by mutual agreement of Owner and manufacturers representative.

END OF SECTION

SECTION 26 3623
AUTOMATIC TRANSFER & BYPASS ISOLATION SWITCHES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section Includes:
 - 1. Furnish and install automatic delayed transition transfer & bypass-isolation switch (DTTS/BPS) with number of poles, amperage, and voltage ratings as shown on the plans. Rate the automatic transfer switch to withstand the rms symmetrical short circuit current available at the automatic transfer switch terminals. Each DTTS/BPS system(s) shall consist of a delayed transition transfer switch and a two-way bypass/isolation switch. All DTTS/BPSs and control modules shall be the product of the same manufacturer.
 - 2. The DTTS/BPS shall transfer the load in delayed transition (break-before-make) mode. Transfer is accomplished with a user-defined interruption period in both directions adjustable from 1 second to 5 minutes in at least 15 increments.

1.03 Codes and Standards

- A. The automatic delayed transition transfer & bypass-isolation switches and accessories shall conform to the requirements of:
 - 1. UL 1008 - Standard for Transfer Switch Equipment
 - 2. IEC 947-6-1 Low-voltage Switchgear and Controlgear; Multifunction equipment; Automatic Transfer Switching Equipment
 - 3. NFPA 70 - National Electrical Code
 - 4. NFPA 99 - Essential Electrical Systems for Health Care Facilities
 - 5. NFPA 110 - Emergency and Standby Power Systems
 - 6. IEEE Standard 446 - IEEE Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications
 - 7. NEMA Standard ICS10-1993 (formerly ICS2-447) - AC Automatic Transfer Switches
 - 8. UL 508 Industrial Control Equipment

1.04 SUBMITTALS, OPERATOR'S MANUAL, AND WARRANTY

- A. Submit in accordance with Section 26 0500, COMMON WORK RESULTS FOR ELECTRICAL.
- B. Include 3 copies of specification sheets showing all standard and optional accessories to be supplied; schematic wiring diagrams; dimension drawings; and interconnection between the

generator set, the transfer switch, and the remote annunciator panel if it is included elsewhere in these Specifications.

- C. Manufacturer shall provide certification that the equipment supplied under this Section has been reviewed and certified by OSHPD to meet the current criteria for special seismic certification in compliance with 2013 CBC 1705A.12.13 and OSHPD CAN 2-1705A.12.13. Include seismic companion anchorage requirements from the testing and as approved by the manufacturer. The manufacturer shall provide an approved label on the equipment enclosure stating that the equipment has been awarded a certificate of compliance for special seismic certification. The label shall include OSHPD special seismic certification pre-approval (OSP) number when relevant.
- D. Provide transfer switch with 3 copies of the operator's manual providing installation and operating instructions.
- E. Each automatic transfer switch set warranted by manufacturer for 1 year from date placed in service.

1.05 Acceptable Manufacturers

- A. Manufacturer regularly engaged in the production of this type of equipment and one that has a local distributor and service organization.
- B. Automatic delayed transition transfer & bypass-isolation switches shall be EATON Series ATC-900.

PART 2 - PRODUCTS

2.01 Mechanically Held Transfer Switch

- A. The transfer switch unit shall be electrically operated and mechanically held. The electrical operator shall be a solenoid mechanism, momentarily energized. The transfer switch unit shall include both electrical and mechanical interlocks to prevent both sets of main contacts from being closed at the same time. Main operators which include overcurrent disconnect devices OR do not include electrical and mechanical interlocks will not be accepted.
- B. All transfer switch sizes shall use only one type of main operator for ease of maintenance and commonality of parts.
- C. The switch shall be positively locked and unaffected by momentary outages, so that contact pressure is maintained at a constant value and contact temperature rise is minimized for maximum reliability and operating life.
- D. All main contacts shall be silver composition. Switches rated 600 amperes and above shall have segmented, blow-on construction for high withstand and close-on capability and be protected by separate arcing contacts.

- E. Inspection of all contacts shall be possible from the front of the switch without disassembly of operating linkages and without disconnection of power conductors. Switches rated 600 amps and higher shall have front removable and replaceable contacts. All stationary and moveable contacts shall be replaceable without removing power conductors and/or bus bars.
- F. Designs utilizing components of molded-case circuit breakers, contactors, or parts thereof, which are not intended for continuous duty, repetitive switching or transfer between two active power sources are not acceptable.
- G. Where neutral conductors are to be solidly connected as shown on the plans, a neutral conductor plate with fully rated AL-CU pressure connectors shall be provided.

2.02 Bypass-Isolation Switch

- A. A two-way bypass-isolation switch shall provide manual bypass of the load to either source and permit isolation of the automatic transfer switch from all source and load power conductors. All main contacts shall be manually driven.
- B. Power interconnections shall be silver-plated copper bus bar. The only field installed power connections shall be at the service and load terminals of the bypass-isolation switch. All control interwiring shall be provided with disconnect plugs.
- C. Separate bypass and isolation handles shall be utilized to provide clear distinction between the functions. Handles shall be permanently affixed and operable without opening the enclosure door. Designs requiring insertion of loose operating handles or opening of the enclosure door to operate are not acceptable.
- D. Bypass to the load-carrying source shall be accomplished with no interruption of power to the load (make before break contacts). Designs which disconnect the load when bypassing are not acceptable. The bypass handle shall have three operating modes: "Bypass to Normal," "Automatic," and "Bypass to Emergency." The operating speed of the bypass contacts shall be the same as the associated transfer switch and shall be independent of the speed at which the manual handle is operated. In the "Automatic" mode, the bypass contacts shall be out of the power circuit so that they will not be subjected to fault currents to which the system may be subjected.
- E. The isolation handle shall provide three operating modes: "Closed," "Test," and "Open." The "Test" mode shall permit testing of the entire emergency power system, including the automatic transfer switches with no interruption of power to the load. The "Open" mode shall completely isolate the automatic transfer switch from all source and load power conductors. When in the "Open" mode, it shall be possible to completely withdraw the automatic transfer switch for inspection or maintenance to conform to code requirements without removal of power conductors or the use of any tools.
- F. When the isolation switch is in the "Test" or "Open" mode, the bypass switch shall function as a manual transfer switch.
- G. Designs requiring operation of key interlocks for bypass isolation or ATSS which cannot be completely withdrawn when isolated are not acceptable.

2.03 Microprocessor Controller

- A. The controller's sensing and logic shall be provided by a single built-in microprocessor for maximum reliability, minimum maintenance, and the ability to communicate serially through an optional serial communication module.
- B. A single controller shall provide twelve selectable nominal voltages for maximum application flexibility and minimal spare part requirements. Voltage sensing shall be true RMS type and shall be accurate to $\pm 1\%$ of nominal voltage. Frequency sensing shall be accurate to $\pm 0.2\%$. The panel shall be capable of operating over a temperature range of -20 to +60 degrees C and storage from -55 to +85 degrees C.
- C. The controller shall be connected to the transfer switch by an interconnecting wiring harness. The harness shall include a keyed disconnect plug to enable the controller to be disconnected from the transfer switch for routine maintenance. Sensing and control logic shall be provided on multi-layer printed circuit boards. Interfacing relays shall be industrial grade plug-in type with dust covers. The panel shall be enclosed with a protective cover and be mounted separately from the transfer switch unit for safety and ease of maintenance. The protective cover shall include a built-in pocket for storage of the operator's manuals.
- D. All customer connections shall be wired to a common terminal block to simplify field-wiring connections.
- E. The controller shall meet or exceed the requirements for Electromagnetic Compatibility (EMC) as follows:
 - 1. EN 55011:1991 Emission standard - Group 1, Class A
 - 2. EN 50082-2:1995 Generic immunity standard, from which:
 - a. EN 61000-4-2:1995 Electrostatic discharge (ESD) immunity
 - b. ENV 50140:1993 Radiated Electro-Magnetic field immunity
 - c. EN 61000-4-4:1995 Electrical fast transient (EFT) immunity
 - d. EN 61000-4-5:1995 Surge transient immunity
 - e. EN 61000-4-6:1996 Conducted Radio-Frequency field immunity
 - 3. IEEE472 (ANSI C37.90A) Ring Wave Test.

2.04 Enclosure

- A. The DTTS/BPS shall be furnished in a Type 1 enclosure unless otherwise shown on the plans.
- B. All standard and optional door-mounted switches and pilot lights shall be 16-mm industrial grade type or equivalent for easy viewing & replacement. Door controls shall be provided on a separate removable plate, which can be supplied loose for open type units.

2.05 Controller Display and Keypad

- A. A four line, 20 character LCD display and keypad shall be an integral part of the controller for viewing all available data and setting desired operational parameters. Operational parameters shall also be available for viewing and limited control through the serial communications input port. The following parameters shall only be adjustable via DIP switches on the controller:

1. Nominal line voltage and frequency
2. Single or three phase sensing
3. Operating parameter protection
4. Transfer operating mode configuration (Open transition, Closed transition or Delayed transition)

All instructions and controller settings shall be easily accessible, readable and accomplished without the use of codes, calculations, or instruction manuals.

2.06 Voltage, Frequency and Phase Rotation Sensing

- A. Voltage and frequency on both the normal and emergency sources (as noted below) shall be continuously monitored, with the following pickup, dropout and trip setting capabilities (values shown as % of nominal unless otherwise specified):

<u>Parameter</u>	<u>Sources</u>	<u>Dropout / Trip</u>	<u>Pickup / Reset</u>
Undervoltage	N&E,3 ϕ	70 to 98%	85 to 100%
Overvoltage	N&E,3 ϕ	102 to 115%	2% below trip
Underfrequency	N&E	85 to 98%	90 to 100%
Overfrequency	N&E	102 to 110%	2% below trip
Voltage unbalance	N&E	5 to 20%	1% below dropout

- B. Repetitive accuracy of all settings shall be within $\pm 0.5\%$ over an operating temperature range of -20°C to 60°C.
- C. Voltage and frequency settings shall be field adjustable in 1% increments either locally with the display and keypad or remotely via serial communications port access.
- D. The controller shall be capable (when activated by the keypad or through the serial port) of sensing the phase rotation of both the normal and emergency sources. The source shall be considered unacceptable if the phase rotation is not the preferred rotation selected (ABC or CBA).
- E. Source status screens shall be provided for both normal and emergency to provide digital readout of voltage on all three phases, frequency and phase rotation.

2.07 Time Delays

- A. An adjustable time delay of 0 to 6 seconds shall be provided to override momentary normal source outages and delay all transfer and engine starting signals. Capability shall be provided to extend this time delay to 60 minutes by providing an external 24 VDC power supply.
- B. A time delay shall be provided on transfer to emergency, adjustable from 0 to 60 minutes, for controlled timing of transfer of loads to emergency.
- C. An adjustable time delay of 0 to 6 seconds to override momentary emergency source outage to delay all retransfer signals during initial loading of engine generator set.

- D. Two time delay modes (which are independently adjustable) shall be provided on re-transfer to normal. One time delay shall be for actual normal power failures and the other for the test mode function. The time delays shall be adjustable from 0 to 60 minutes. Time delay shall be automatically bypassed if the emergency source fails and the normal source is acceptable.
- E. A time delay shall be provided on shut down of engine generator for cool down, adjustable from 0 to 60 minutes.
- F. A time delay activated output signal shall also be provided to drive an external relay(s) for selective load disconnect control. The controller shall have the ability to activate an adjustable 0 to 5 minute time delay in any of the following modes:
 - 1. Prior to transfer only.
 - 2. Prior to and after transfer.
 - 3. Normal to emergency only.
 - 4. Emergency to normal only.
 - 5. Normal to emergency and emergency to normal.
 - 6. All transfer conditions or only when both sources are available.
- G. The controller shall also include the following built-in time delays for Delayed Transition & Bypass-Isolation operation:
 - 1. 0 to 5 minute time delay for the load disconnect position for delayed transition operation.
- H. All time delays shall be adjustable in 1 second increments, except the extended parallel time, which shall be adjustable in .01 second increments.
- I. All time delays shall be adjustable by using the LCD display and keypad or with a remote device connected to the serial communications port. The time delay value displayed on the LCD or remote device shall be the remaining time until the next event occurs.

2.08 Additional Features

- A. A three position momentary-type test switch shall be provided for the test / automatic / reset modes. The test position will simulate a normal source failure. The reset position shall bypass the time delays on either transfer to emergency or retransfer to normal. Switches which require utilizing the keypad and display function or have no manual time delay bypass means are not acceptable.
- B. A SPDT contact, rated 5 amps at 30 VDC, shall be provided for a low-voltage engine start signal. The start signal shall prevent dry cranking of the engine by requiring the generator set to reach proper output, and run for the duration of the cool down setting, regardless of whether the normal source restores before the load is transferred.
- C. Auxiliary contacts, rated 10 amps, 250 VAC shall be provided consisting of one contact, closed when the DTTS is connected to the normal source and one contact closed, when the DTTS is connected to the emergency source.
- D. LED indicating lights (16 mm industrial grade, type 12) shall be provided; one to indicate when the DTTS is connected to the normal source (green) and one to indicate when the DTTS is connected to the emergency source (red).

- E. LED indicating lights (16 mm industrial grade, type 12) shall be provided and energized by controller outputs. The lights shall provide true source availability of the normal and emergency sources, as determined by the voltage sensing trip and reset settings for each source.
- F. The following features shall be built-in to the controller, but capable of being activated through keypad programming or the serial port only when required by the user:
 - 1. Provide the ability to select “commit/no commit to transfer” to determine whether the load should be transferred to the emergency generator if the normal source restores before the generator is ready to accept the load.
 - 2. Terminals shall be provided for a remote contact which opens to signal the DTTS to transfer to emergency and for remote contacts which open to inhibit transfer to emergency and/or retransfer to normal. Both of these inhibit signals can be activated through the keypad or serial port.
 - 3. The controller shall be capable of accepting a normally open contact that will allow the transfer switch to function in a non-automatic mode using an external control device.
 - 4. Engine Exerciser - The controller shall provide an internal engine exerciser. The engine exerciser shall allow the user to program up to seven different exercise routines. For each routine, the user shall be able to:
 - a. Enable or disable the routine.
 - b. Enable or disable transfer of the load during routine.
 - c. Set the start time,
 - 1) time of day
 - 2) day of week
 - 3) week of month (1st, 2nd, 3rd, 4th, alternate or every)
 - d. Set the duration of the run.
- G. At the end of the specified duration the switch shall transfer the load back to normal and run the generator for the specified cool down period. A 10-year life battery that supplies power to the real time clock in the event of a power loss will maintain all time and date information.
- H. System Status - The controller LCD display shall include a “System Status” screen which shall be readily accessible from any point in the menu by depressing the “ESC” key a maximum of two times. This screen shall display a clear description of the active operating sequence and switch position. For example,

Normal Failed

Load on Normal

TD Normal to Emerg
2min15s

Controllers that require multiple screens to determine system status or display “coded” system status messages, which must be explained by references in the operator’s manual, are not permissible.

- I. Self Diagnostics - The controller shall contain a diagnostic screen for the purpose of detecting system errors. This screen shall provide information on the status input signals to the controller which may be preventing load transfer commands from being completed.

- J. Communications Interface – The controller shall be capable of interfacing, through an optional serial communication module, with a network of transfer switches, locally (up to 4000 ft.) or remotely through modem serial communications. Standard software specific for transfer switch applications shall be available by the transfer switch manufacturer. This software shall allow for the monitoring, control and setup of parameters.
- K. Data Logging – The controller shall have the ability to log data and to maintain the last 99 events, even in the event of total power loss. The following events shall be time and date stamped and maintained in a non-volatile memory:
 - 1. Event Logging
 - 1. Date and time and reason for transfer normal to emergency.
 - 2. Date and time and reason for transfer emergency to normal.
 - 3. Date and time and reason for engine start.
 - 4. Date and time engine stopped.
 - 5. Date and time emergency source available.
 - 6. Date and time emergency source not available.
 - 2. Statistical Data
 - 1. Total number of transfers.
 - 2. Total number of transfers due to source failure.
 - 3. Total number of days controller is energized.
 - 4. Total number of hours both normal and emergency sources are available.
- L. Communications Module - A full duplex RS485 interface shall be installed in the DTTS controller to enable serial communications. The serial communications shall be capable of a direct connect or multi-drop configured network. This module shall allow for the seamless integration of existing or new communication transfer devices. The serial communication interface shall be equal to ASCO Accessory 72.

2.09 Withstand and Closing Ratings

- A. The DTTS/BPS shall be rated to close on and withstand the available RMS symmetrical short circuit current at the DTTS/BPS terminals with the type of overcurrent protection provided.
- B. The DTTS/BPS shall be UL listed in accordance with UL 1008 and be labeled in accordance with that standard's 1½ and 3 cycle, long-time ratings. DTTS/BPSs which are not tested and labeled with 1½ and 3 cycle (any breaker) ratings and have series, or specific breaker ratings only, are not acceptable.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Provide wiring within transfer switches in accordance to NFPA-76A and NEC requirements.
- B. Install and connect the automatic transfer switches components of essential electrical system so that within 10 seconds of a power supply drop in the utility company's normal service, the generator starts and automatically transfer loads to the generator source.

- C. Installation is in accordance with all local, state and federal codes. Verify code requirements as associated with engine generator, transfer switch, fuel storage and transfer prior to installation.

3.02 TESTS AND CERTIFICATION

- A. The complete DTTS/BPS shall be factory tested to ensure proper operation of the individual time, voltage, frequency and time delay settings are in compliance with the specification requirements. Subject the complete automatic transfer switch to a dielectric strength test per NEMA ICS 1-109.05.
- B. Incorporate the transfer switches into final system test.
- C. Include the complete emergency system, consisting of generator, emergency distribution equipment and automatic transfer switches in all final test operations.
- D. Upon request, the manufacturer shall provide a notarized letter certifying compliance with all of the requirements of this specification including compliance with the above codes and standards, and withstand and closing ratings. The certification shall identify, by serial number(s), the equipment involved. No exceptions to the specifications, other than those stipulated at the time of the submittal, shall be included in the certification.
- E. The DTTS/BPS manufacturer shall be certified to ISO 9001 International Quality Standard and the manufacturer shall have third party certification verifying quality assurance in design/development, production, installation and servicing in accordance with ISO 9001.components and correct overall sequence of operation and to ensure that the operating transfer.

3.03 Service Representation

- A. The DTTS/BPS manufacturer shall maintain a national service organization of company-employed personnel located throughout the contiguous United States. The service center's personnel must be factory trained and must be on call 24 hours a day, 365 days a year.
- B. The manufacturer shall maintain records of each switch, by serial number, for a minimum of 20 years.

END OF SECTION

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SECTION 26 4300
SURGE PROTECTION DEVICES (SPD)

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section Includes:
 - 1. SPD for service entrance.

1.03 SUBMITTALS

- A. Submit all related SPD Specifications, Drawings, maintenance manuals, installation instructions, and UL 1449, third edition, listed surge suppression ratings of specified protection modes.

1.04 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: ISO-9001 certification or SPD manufacturer's complete quality control and documentation procedures of firms regularly engaged in the manufacture of SPD product for Category-C3 (ANSI/IEEE C62.41) and whose product have been in satisfactory service for not less than 5 years.
- B. Provide local support for the SPD.
- C. Warrant the service entrance SPD for 5 years for complete parts and factory provided on site labor. Warrant the distribution panel SPD for 1 year.
- D. Both the service entrance and distribution panel SPD of the same manufacturer.

1.05 CODES AND STANDARDS

- A. Listed per UL 1449, third edition, and complimentary listed per UL 1283 as an RFI/EMI filter.
- B. Comply with ANSI/IEEE (C62.1 or C62.11) and C62.45 test procedures for Category-C3 established in C62.41 (1991).

- C. Comply with NEMA as applicable to construction and NEC 280 for installation and NEC 110.9/110.10 for overcurrent protection.
- D. Design and tested to survive the following 8x20 microsecond surge currents following IEEE Test Procedures and wait times established in C62.1/C62.11 and C62.45:
- | | |
|------------------------------|----------------------------|
| Wye Systems | Delta Systems |
| Line to Ground: 10 x 25 KA | Line to Line: 10 x 25 KA |
| Line to Neutral: 10 x 25 KA | Line to Ground: 10 x 25 KA |
| Neutral to Ground: 10 x 25 K | |
- E. The individual protection mode designed and tested to survive 1250 Category-C3 (10KA) surge currents as described in IEEE C62.41 (1991).

PRODUCTS

1.06 SPD FOR SERVICE ENTRANCE

- A. Install SPD devices at service entrances of each building and as shown on the riser diagram.
- B. Wye systems shall have suppression elements between each phase conductor and the system neutral, between each phase conductor and the system ground and between the neutral conductor and ground.
- C. Each phase shall have a minimum of two modules. Fuse the surge modules at a minimum rating of 10 amp and a current limit rating of 200,000 AIC. Modules and fuses field replaceable.
- D. Provide visible indication of proper SPD connection and operation. The indicator consists of an LED array. Use no single LED or neon indicators.
- E. Equip the SPD device with an audible alarm that shall actuate when any part of the surge circuitry has been damaged. Provide a silence button with the alarm.
- F. The SPD shall exhibit Sine Wave Tracking circuitry and shall provide high frequency noise filtering up to 40dB attenuation (100KHZ to 100MHZ).
- G. SPD shall meet or exceed the following criteria:
1. Minimum single impulse current rating (L-N + L-G): 100,000 amp per phase.
 2. Incorporate hybrid circuitry.
 3. UL 1449, third edition, (ANSI C62.41-1991 Category-C) clamping voltage shall not exceed the following:

Voltage	L-N	L-G	N-G
120/208	400 volt	400 volt	400 volt
 4. The Category-C3 clamping voltage ANSI/IEEE C.62-41-1991 (20KV-1.2/50 microseconds, 10KA-8.20 microseconds shall not exceed the following:

Voltage	L-N	L-G	N-G

120/208 550 volt 550 volt 550 volt

- H. Provide full redundant protection for each phase that consists of solid-state components and shall operate bi-directionally.
- I. Maximum Continuous Operating Voltage of the SPD: Greater than 110 percent of the nominal system voltage.
- J. Provide an internal disconnect (3-pole, UL listed).
- K. Manufacturers: EFI Electronics Corporation, Titan SE Series, Lea International.

EXECUTION

1.07 SERVICE ENTRANCE

- A. Install one SPD at each utility service entrance or as indicated on Drawings. Follow manufacturer's installation instructions.
- B. Install SPD on the load side of the service entrance. Provide breaker for disconnect in service entrance equipment, size breaker to manufacturers installation instructions.
- C. Provide 6AWG stranded copper conductor or larger conductors between SPD and point of attachment. Keep the conductors short and straight as possible. Provide 36-inch maximum lead length of connecting conductors.
- D. Bond SPD's ground to the service entrance ground.

END OF SECTION

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SECTION 26 5100
INTERIOR LIGHTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section Includes:
 - 1. Interior lighting systems, including luminaires, ballasts, lamps and emergency lighting equipment.
- B. Related Work:
 - 1. Section 26 0500, COMMON WORK RESULTS FOR ELECTRICAL.
 - 2. Section 26 0533, RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS: Conduits, fittings, and boxes for raceway systems.
 - 3. Section 26 0519, LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW): Low voltage power and lighting wiring.
 - 4. Section 26 0526, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path for possible ground fault currents.
 - 5. Section 26 5600, SITE LIGHTING.
 - 6. Section 26 5670, LIGHTING ACCEPTANCE TESTING.

1.03 SUBMITTALS

- A. Submit in accordance with Section 26 0500, COMMON WORK RESULTS FOR ELECTRICAL.
- B. Shop Drawings:
 - 1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
 - 2. Include electrical ratings, dimensions, mounting, details, materials, terminations, wiring and connection diagrams, photometric data, ballasts, luminaires, lamps and controls.

1.04 APPLICABLE PUBLICATIONS

- A. Publications listed below (including amendments, addenda, revisions, supplements) form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.

- B. American Society for Testing and Materials (ASTM).
- C. American National Standards Institute (ANSI).
- D. Aluminum Association Inc. (AA).
- E. Illuminating Engineering Society of North America (IESNA).
- F. National Electrical Manufacturers Association (NEMA).
- G. National Fire Protection Association (NFPA).
- H. Underwriters Laboratories, Inc. (UL).

1.05 DEFINITIONS

- A. Lighting terminology used herein is defined in IES
- B. Exception: The term “driver” is used herein to cover both drivers and power supplies, where applicable.
- C. Clarification: The term “LED light source(s)” is used herein per IES to cover LED package(s), module(s), and array(s).

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Materials and equipment shall be in accordance with CEC, UL, ANSI, and as shown on the drawings and specified.

2.02 LIGHTING FIXTURES (LUMINAIRES)

- A. Shall be in accordance with NFPA 70, UL 1598 and shall be as shown on drawings and as specified. All luminaires shall have been certified to the California Energy Commission by its manufacturer to comply with the efficiency standards as per California Code of Regulations Title 24, Part 6, Section 111 referencing the Appliance Efficiency Regulations in Title 20. Post certification with building permit.
- B. Sheet Metal:
 - 1. Shall be formed to prevent warping and sagging. Housing, trim and lens frame shall be true, straight (unless intentionally curved) and parallel to each other as designed.
 - 2. Wireways and fittings shall be free of burrs and sharp edges and shall accommodate internal and branch circuit wiring without damage to the wiring.
 - 3. When installed, any exposed fixture housing surface, trim frame, door frame and lens frame shall be free of light leaks; lens doors shall close in a light tight manner.

- a. Hinged door closure frames shall operate smoothly without binding when the fixture is in the installed position, and latches shall function easily by finger action without the use of tools.
- C. Ballasts shall be serviceable while the fixture is in its normally installed position, and shall not be mounted to removable reflectors or wireway covers.
- D. Recessed fixtures shall be of the type approved for the ceiling and insulation conditions and appropriate for the installation location. Insulation must be held back from the fixture to provide manufacturers' recommended clearances for proper operation. Thermal tripping shall be the installer's responsibility to correct. Where installed in fire rated ceilings, coordinate installation of fire rated enclosures around the ceiling penetrations. Fixtures shall contain the proper through wiring capacity for that which is shown on the plans.
- E. Recessed fixtures shall be provided with the appropriate trims and hardware compatible with the ceiling type shown. Plaster frames are required where plaster or gypsum board ceilings are encountered.
- F. Mechanical Safety: Lighting fixture closures (lens doors, trim frame, hinged housings, etc.) shall be retained in a secure manner by captive screws, chains, captive hinges or fasteners such that they cannot be accidentally dislodged during normal operation or routine maintenance.
- G. Metal Finishes:
 - 1. The manufacturer shall apply standard finish (unless otherwise specified) over a corrosion resistant primer, after cleaning to free the metal surfaces of rust, grease, dirt and other deposits. Edges of pre-finished sheet metal exposed during forming, stamping or shearing processes shall be finished in a similar corrosion resistant manner to match the adjacent surface(s). Fixture finish shall be free of stains or evidence of rusting, blistering, or flaking.
 - 2. Interior light reflecting finishes shall be white with not less than 85 percent reflectances, except where otherwise specified on the drawing.
 - 3. Exterior finishes shall be as shown on the drawings.
- H. Provide all lighting fixtures with a specific means for grounding metallic wireways and housings to an equipment grounding conductor.
- I. Recessed compact fluorescent or LED fixtures shall be manufactured specifically for compact fluorescent or LED lamps with ballasts or drivers integral to the fixture. Assemblies designed to retrofit fixtures are prohibited except when described in this fashion. Fixtures shall be designed for lamps as specified.
- J. Provide wire lamp guard on all exposed lamp fixture/luminaires.
- K. Provide fixtures with a U.L. listing for shower or shower rating above shower or tub areas.

2.03 LED LUMINAIRE REQUIREMENTS

- A. General Requirements:
 - 1. Luminaire shall have an external label per ANSI C136.15

2. Luminaire shall have an internal label per ANSI C136.22.
3. Luminaires shall start and operate in -20°C to +40°C ambient.
4. LED light source(s) and driver(s) shall be RoHS compliant.

2.04 LED DRIVER

- A. Driver
 1. Rated case temperature shall be suitable for operation in the luminaire operating in the ambient temperatures as indicated.
 2. Shall accept the voltage or voltage range indicated, and shall operate normally for input voltage fluctuations of plus or minus 10 percent. Consistent with NEMA SSL 1.
 3. Shall have a minimum Power Factor (PF) of 0.90 at full input power and across specified voltage range.
- B. Electromagnetic interference
 1. Shall have a maximum Total Harmonic Distortion (THD) of 20% at full input power and across specified voltage range.
 2. Shall comply with FCC 47 CFR part 15 non-consumer RFI/EMI standards.
- C. The following shall be in accordance with corresponding sections of ANSI C136.37
 1. Wiring and grounding
 2. All internal components shall be assembled and pre-wired using modular electrical connections.
 3. Mounting provisions
 4. Terminal blocks for incoming AC lines
 5. Latching and hinging
 6. Ingress protection

2.05 LAMPS

- A. Provide lamps for all luminaires.
- B. LED LIGHT SOURCE
 1. Minimum Color Rendering Index (CRI): 60.
 2. Correlated Color Temperature (CCT)
 - a. CCT shall be as listed in Table 1 below:

Table 1. Allowable CCT

Manufacturer-Rated Nominal CCT (K)	Allowable LM-79 Chromaticity Values Measured CCT (K)
2700	2580 to 2870
3000	2870 to 3220
3500	3220 to 3710
4000	3710 to 4260
4500	4260 to 4746
5000	4745 to 5311
5700	5310 to 6020

6500

6020 to 7040

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Installation and furnishing of lighting fixtures shall be in accordance with the CEC, manufacturer's instructions and as shown on the drawings or specified. Fixtures damaged in transit and storage prior to completion shall be replaced at Contractor's expense.
- B. Align, mount and level the lighting fixtures uniformly.
- C. Avoid interference with and provide clearance for equipment. Where the indicated locations for the lighting fixtures conflict with the locations for equipment, change the locations for the lighting fixtures by the minimum distances necessary as approved by the Architect. The Architectural reflected ceiling plan will take precedence over electrical plans.
- D. For suspended lighting fixtures, the mounting heights shall provide the clearances between the bottoms of the fixtures and the finished floors as shown on the drawings.
- E. Lighting Fixture Supports:
 - 1. Contractor shall provide support for all of the fixtures independent of suspended ceilings. Supports may be anchored to channels of the ceiling construction, to the structural slab or to structural members within a partition, or above a suspended ceiling.
 - 2. Shall maintain the fixture positions after cleaning and relamping.
 - 3. Shall support the lighting fixtures without causing the ceiling or partition to deflect.
 - 4. Hardware for recessed fluorescent fixtures:
 - 5. Fixtures shall be supported as detailed on drawings and as required by DSA standards.
 - 6. Installation: Fixtures shall be securely mounted on ceilings and walls with appropriate fastening devices. "Drop-in" type T-bar fixtures shall be secured with #12 gauge safety "earthquake wires" as described by California Code of Regulations Title 24 Part 2, Chapter 47. "Earthquake clips" will be required for fastening to the T-bar system in addition to safety wire. Surface mounted fluorescent fixtures shall be solidly screwed or clipped into framing above drywall with 4-#10 sheet metal screws into each fixture. Provide blocking for screw supports behind all surface mounted lighting fixtures weighing more than 15 lbs.
 - 7. Surface mounted lighting fixtures:
 - a. Fixtures shall be bolted against the ceiling independent of the outlet box at four points spaced near the corners of each unit. The bolts shall be minimum ¼-20 bolt, secured to structural ceiling. Non-turning studs may be attached to the building structure by 12 gauge safety hangers.
 - 8. Fixtures mounted in open construction shall be secured directly to the building structure with approved bolting and clamping devices.
 - 9. Single or double pendent mounted lighting fixtures:
 - a. Each stem shall be supported by an approved outlet box, mounted swivel joint and canopy which holds the stem captive and provides spring load (or approved equivalent) dampening of fixture oscillations. Outlet box shall be supported vertically from the building structure and be allowed to swing to a 45 degree angle.

10. Outlet boxes for support of lighting fixtures (where permitted) shall be secured directly to the building structure with approved devices or supported vertically in a hung ceiling from the building structure with a nine gauge wire hanger, and be secured by an approved device to a main ceiling runner or cross runner to prevent any horizontal movement relative to the ceiling.
- F. Furnish and install the specified lamps for all lighting fixtures as part of this project.
- G. Coordinate between the electrical and ceiling trades to ascertain that approved lighting fixtures are furnished in the proper sizes and installed with the proper devices (hangers, clips, trim frames, flanges), to match the ceiling system being installed.
- H. Bond lighting fixtures and metal accessories to the grounding system as specified in Section 26 0526, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.
- I. At completion of project, relamp all fixtures which have failed/burned-out lamps. Clean all fixtures, lenses, diffusers and louvers that have accumulated dust/dirt during construction.
- J. Provide unswitched leg of interior lighting branch circuit to integral emergency battery pack light fixtures, exit signs and night lights as applicable per lighting plans.
- K. Wallmount fixtures in walkway areas shall not project more than 4 inches from wall when projection occurs lower than 80 inches.

END OF SECTION

SECTION 26 5600
EXTERIOR LIGHTING

PART 1 - GENERAL

1.01 DESCRIPTION

This section specifies the furnishing, installation, and connection of exterior luminaires, controls, poles and supports.

1.02 RELATED WORK

Section 26 0500, COMMON WORK RESULTS FOR ELECTRICAL.

Section 26 0533, RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS: Conduits, fittings, and boxes for raceway systems.

Section 26 0519, LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW): Low voltage power and lighting wiring.

Section 26 0546.13, ELECTRIC UTILITY SYSTEMS: Underground handholes and conduits.

Section 26 0526, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path for possible ground fault currents.

Section 26 5100, INTERIOR LIGHTING.

Section 26 5670, LIGHTING ACCEPTANCE TESTING.

1.03 SUBMITTALS

Submit in accordance with Section 26 0500, COMMON WORK RESULTS FOR ELECTRICAL.

Shop Drawings:

1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
2. Include electrical ratings, dimensions, mounting, details, materials, required clearances, terminations, wiring and connection diagrams, photometric data, ballasts, poles, luminaires, effective projected area (EPA), lamps and controls.

1.04 APPLICABLE PUBLICATIONS

Publications listed below (including amendments, addenda, revisions, supplements) form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.

American Society for Testing and Materials (ASTM).

American Concrete Institute (ACI).

American National Standards Institute (ANSI).

Aluminum Association Inc. (AA).

Illuminating Engineering Society of North America (IESNA).

National Electrical Manufacturers Association (NEMA).

National Fire Protection Association (NFPA).

Underwriters Laboratories, Inc. (UL).

1.05 DELIVERY, STORAGE, AND HANDLING

Poles: Do not store poles on ground. Store poles so they are at least one foot above ground level. Do not remove factory-applied pole wrappings until just prior to installation of pole.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

Materials and equipment shall be in accordance with CEC, UL, ANSI, as shown on the drawings and as specified.

2.02 POLES

General:

1. Poles shall be steel or aluminum as specified in fixture schedule and as shown on the drawings. Finish shall be as approved by the Architect. Assume custom color for bidding.
2. The pole and arm assembly shall be designed for wind loading of 100 miles per hour, with an additional 30 percent gust factor, supporting luminaire(s) having the effective projected areas indicated as per manufacturer data.
3. Poles shall anchor-bolt type designed for use with underground supply conductors. Poles shall have gasketed handhole with a minimum clear opening of 2.5" x 5". Handhole cover shall be secured by stainless steel captive screws.
4. Provide a steel grounding stud opposite hand hole openings.

Provide a base cover matching the pole in material and color to conceal the mounting hardware pole-base welds and anchor bolts.

Hardware: All necessary hardware shall be 300 series tamperproof stainless steel.

Types:

5. Aluminum: Provide aluminum poles manufactured of corrosion resistant AA AAH35.1 aluminum alloys conforming to AASHTO LTS-4 for Alloy 6063-T6 or Alloy 6005-T5 for wrought alloys, and Alloy 356-T4 (3,5) for ASTM B108-01 cast alloys. Poles shall be seamless extruded or spun seamless type. Provide a pole grounding connection designed to prevent electrolysis when used with copper ground wire. Base covers for aluminum poles shall be cast from 356-T6 aluminum alloy in accordance with ASTM B108-01.
6. Steel: Provide steel poles having minimum 11-gage steel with minimum yield/strength of 48,000 psi and iron-oxide primed factory finish. Base covers for steel poles shall be structural quality hot-rolled carbon steel plate having a minimum yield of 36,000 psi.

2.03 FOUNDATIONS FOR POLES

Foundations shall be cast-in-place concrete.

Foundations shall support the effective projected area of the specified pole, arm(s), luminaire(s), and all accessories specified under wind conditions as specified in this section.

Place concrete in spirally wrapped treated paper forms for round foundations, and construct forms for square foundations.

Rub-finish and round all above-grade concrete edges to approximately 1/4" radius unless otherwise detailed.

Concrete shall have 3000 psi minimum 28 day compressive strength.

Anchor bolt assemblies and reinforcing of concrete foundations shall be as shown on the drawings and meet ACI 318. Anchor bolts shall be in a welded cage or properly positioned by the tie wire to stirrups.

Install a copperclad ground rod, not less than 5/8" diameter by 8' long in pullbox adjacent to each fixture. Where rock or layered rock is present, drill a hole not less than 2" in diameter and 6' deep, backfill with tamped fine sand and drive the rod into the hole. Bond the rod to the pole with not less than number 6 AWG bare copper wires. The method of bonding shall be approved for the purpose.

After leveling of pole grout base solid between plate and footing with dry pack concrete for vibration reduction.

2.04 LUMINAIRES

UL 1598 and ANSI C136.17. Luminaires shall be weatherproof, heavy duty, outdoor types designed for efficient light utilization, adequate dissipation of lamp and ballast heat and safe cleaning and relamping.

Light emitting diode (LED)-based solid state lighting (SSL) products shall be factory tested in accordance to the International Engineering Society (IES) LM-79 recommendations and meet ANSI C78.377-2008 standards.

LED light sources shall be factory tested in accordance to IES LM-80 recommendations.

LED-based SSL product shall incorporate an external heat sink, integral to the luminaire.

IESNA HB-9 and RP-8 light distribution pattern types shall be as indicated on the drawings.

Incorporate associated ballasts and drivers within the luminaire housing.

Lenses shall be frame-mounted heat-resistant, borosilicate glass, prismatic refractors. Attach the frame to the luminaire housing by hinges or chain.

Pre-wire internal components to terminal strips at the factory.

Bracket mounted luminaries shall have leveling provisions and clamp type adjustable slip-fitters with locking screws.

Materials shall be rustproof. Latches and fittings shall be non-ferrous metal.

LED-based SSL luminaires shall be manufactured specifically for LED lamps with drivers integral to the luminaire housing.

2.05 LAMPS

Luminaires shall be listed for the lamp specified on the associated electrical plans. Install the proper lamps in every luminaire installed.

Lamps shall be clear or coated as recommended by luminaire manufacturer to provide for maximum luminaire efficiency in fixture used.

2.06 LED-BASED SOLID STATE DRIVERS

Shall be listed by either U.L. or equal listing agency and comply with IEEE C.62.41-1991, Class A operation.

Provide a minimum power factor of 0.9.

Minimum operating temperature appropriate for outdoor environments.

Shall operate at a frequency greater than or equal to 120Hz.

PART 3 - EXECUTION

3.01 INSTALLATION

Install lighting in accordance with the CEC, as shown on the drawings, and in accordance with manufacturer's recommendations.

Poles:

1. Provide pole foundations with galvanized steel anchor bolts, threaded at the top end and bent 1.57 rad 90 degrees at the bottom end. Provide galvanized nuts, washers, and ornamental covers for anchor bolts. Thoroughly compact backfill with compacting arranged to prevent pressure between conductor, jacket, or sheath and the end of conduit elbow. Adjust poles as necessary to provide a permanent vertical position with the bracket arm in proper position for luminaire location.
2. After the poles have been installed, shimmed and plumbed, grout the spaces between the pole bases and the concrete base with non-shrink concrete grout material. Provide a plastic or copper tube, of not less than 3/8" inside diameter, through the grout tight to the top of the concrete base for moisture weeping.
3. Attach pole base cover to pole flange with set screws.

Foundation Excavation: Depth shall be as indicated on drawings. Dig holes large enough to permit the proper use of tampers to the full depth of the hole. Place backfill in the hole in 6" maximum layers and thoroughly tamp. Place surplus earth around the pole in a conical shape and pack tightly to drain water away.

Photocell Switch Aiming (where applicable): Aim switch according to manufacturer's recommendations. Mount switch on or beside each luminaire when switch is provided in cast weatherproof aluminum housing with swivel arm or set adjustable window slide for proper footcandles photocell turn-on.

3.02 GROUNDING

Ground noncurrent-carrying parts of equipment including metal poles, luminaires, mounting arms, brackets, and metallic enclosures as specified in Section 26 0526, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS. Where copper grounding conductor is connected to a metal other than copper, provide specially treated or alloyed connectors suitable and listed for this purpose.

END OF SECTION

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SECTION 26 5670
LIGHTING ACCEPTANCE TESTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section Includes:
 - 1. The Contractor shall be responsible for the Certificate of Acceptance, but coordinate with the Certified California Lighting Controls Test Technician to assure that all required documents have been filed with and approved by the enforcement agency prior to receiving a final occupancy permit. The Certificate of Acceptance will indicate that the Contractor has demonstrated acceptance requirements of the plans and specifications, that current requirements for installation certificates are met, and that currently required operating and maintenance information (as well as the Certificate of Acceptance) were provided to the building Owner.
 - 2. Testing, evaluation and calibration of lighting controls equipment provided, installed and connected in Division 26.
 - 3. Documentation of test results, completion of "Certificate of Acceptance" and "Certificate of Installation" forms and filing with the enforcement agency for approval.
 - 4. Specific Jobsite Conditions:
 - a. Acceptance testing must be tailored for each specific design, job site, and climactic conditions. While the steps for conducting each test remain consistent, the application of the tests to a particular site may vary. The Contractor shall review the construction documents and include all required time, material, testing equipment, etc. as required to complete the requirements of this section.
- B. Related Work:
 - 1. Section 26 0500, COMMON WORK RESULTS FOR ELECTRICAL.
 - 2. Section 26 5100, INTERIOR LIGHTING.
 - 3. Section 26 5600, EXTERIOR LIGHTING.
 - 4. Section 26 0926, LIGHTING CONTROL SYSTEM.
 - 5. Section 26 0900, CONTROLS AND INSTRUMENTATION.

1.03 REFERENCES

- A. Acceptance Testing Criteria: 2016 Building Energy Efficiency Standards Non-Residential Compliance Manual.

1.04 SYSTEM DESCRIPTION

- A. Performance Requirements:
 - 1. All material, equipment, labor and technical supervision to perform tests, calibrations and documentation specified herein.
- B. Scope of Testing, Evaluation and Calibration (as applicable):
 - 1. Automatic (master) time switches.
 - 2. Occupancy sensors.
 - 3. Automatic daylighting controls.
 - 4. Photo electric sensors.
 - 5. Daylighting controls.
 - 6. Outdoor astronomical time switches.
 - 7. Area controls.

1.05 SUBMITTALS

- A. Test Reports:
 - 1. Written record of all tests and completion of forms included in this section.
 - 2. At completion of project, assemble a final test report. Submit report to the enforcement agency and the Owner prior to final occupancy to include:
 - a. Summary of project.
 - b. Description of systems and equipment tested.
 - c. Visual inspection report.
 - d. Description of tests.
 - e. Test results.
 - f. Conclusions and recommendations.
 - 3. Report shall be bound in booklet form, include on the Contractor's letterhead the title of the report and the systems tested.
- B. Constructability Plan Review
 - 1. The Contractor shall review the construction drawings and specifications to understand the scope of the acceptance tests and raise critical issues that might affect the success of the acceptance tests prior to starting construction. Any constructability issues associated with the lighting system should be forwarded to the design team for review/modifications prior to equipment procurement and installation. The Contractor shall submit on company letterhead, with the lighting control equipment required by Section 26 0500, COMMON WORK RESULTS FOR ELECTRICAL, 1.4B, a letter confirming that the constructability review has been completed and their company has reviewed and is prepared to complete the lighting acceptance testing required by this section.

PART 2 - PRODUCTS

2.01 FORMS

- A. Lighting Installation forms and verification procedures for lighting systems that require acceptance testing can be downloaded from the following website:
www.energy.ca.gov/2015publications/CEC-400-2015-033/appendices/forms/NRCI
- B. Lighting Acceptance forms are to be provided by a Certified California Lighting Controls Acceptance Test Technician. The California Energy Commission adopted changes to the California building Efficiency Standards (Title 24, Parts 1 and 6) that require lighting controls and devices to be certified as properly installed and operational, prior to issuance of occupancy permits. All Acceptance Technicians must be employed by an Acceptance Test employer that provides support as well as quality control. Certified California Lighting Controls Acceptance Test Technicians can be found at the following website: www.calctp.org/acceptance-technicians/contractors
- C. These completed forms will be the deliverable product to the enforcement agency and Owner as described in 1.4 of this section.

PART 3 - EXECUTION

3.01 FIELD QUALITY CONTROL

- A. Tests:
 - 1. Contractor's Responsibilities:
 - a. Perform all required tests required by this section.
 - b. Schedule testing with building Owner.
 - c. Provide Installation forms
 - d. Acceptance forms provided by California Certified Lighting Controls Technician hired by Contractor.
 - e. Calibration of equipment such as light meters, photo electric controls, etc.
 - f. Programming of time switches (interior/exterior lighting) for operations as directed by the Owner.

3.02 ADJUSTING

- A. Final Settings: The Contractor shall be responsible for implementing all final settings and adjustments on controls equipment as required for a complete and operating system.

END OF SECTION

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SECTION 26 9115
ELECTRICAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. General requirements that apply to implementation of commissioning of electrical equipment.
- B. Related work:
 - 1. 01 9113 General Commissioning Processes lists Division 26 commissioned systems, and lists other commissioning sections in these Specifications.

1.02 RESPONSIBILITIES

- A. Division 26 Contractors: Participate in the Commissioning process as a commissioning team member as described in Section 01 91 13 and in the Commissioning Plan

1.03 SUBMITTALS

- A. Division 26 Contractors shall provide submittal documentation relative to commissioning as required in Section 01 3000 Administrative Requirements.

PART 2 - PRODUCTS

2.01 TEST EQUIPMENT

- A. Refer to Section 01 9113 Part 2 for Division 21, 22 and 23 requirements.

PART 3 - EXECUTION

3.01 COMMISSIONING PROCESS REQUIREMENTS

- A. Refer to Section 01 9113 and the Commissioning Plan for information on meetings, functional testing, operations & maintenance data, training requirements, and other commissioning activities.

3.2 TESTING REQUIREMENTS

- A. This section specifies the functional testing requirements for Division 26 systems and equipment. From these requirements, the Commissioning Provider will develop testing

procedures in accordance with Section 01 9113 and the Commissioning Plan. The test procedures for each piece of equipment or system will contain the information below.

1. Contractors responsible for installation, burn-in, and other testing must be completed with these tasks prior to commissioning testing.
 2. Contractor responsibilities for executing functional tests.
 3. A list of equipment & components being tested
 4. Functions, modes, and testing conditions
 5. Required monitoring
 6. Acceptance criteria
 7. Sampling strategies allowed
- B. Refer to Section 01 9113 GENERAL COMMISSIONING PROCESSES and the commissioning plan for sample lighting equipment testing requirements.

END OF SECTION

SECTION 27 1300
INTERCOMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Refer to City IT Cabling requirements for additional information. City requirements supercedes what stated on this specs.

1.02 SUMMARY

- A. This Section Includes:
 - 1. Telecommunications Cabling at the new or remodeled buildings for the project. Backbone and horizontal cabling comprised of copper and fiber cabling, and support systems are covered under this document.
 - 2. The Horizontal (workstation) Cabling System shall consist of a minimum of 4-pair Unshielded Twisted Pair (UTP) Copper Cables to each work area outlet unless otherwise noted for specific locations. The cables shall be installed from the Work Area Outlet to the Telecommunications Room (TR) located on the same floor, and routed to the appropriate rack serving that area and terminated as specified in this document.
 - 3. All cables and related terminations, support and grounding hardware shall be furnished, installed, wired, tested, labeled, and documented by the Telecommunications contractor as detailed in this document.
 - 4. Product specifications, general design considerations, and installation guidelines are provided in this document. Quantities of telecommunications outlets, typical installation details, cable routing and outlet types will be provided as an attachment to this document. If the bid documents are in conflict, this specification shall take precedence. The successful vendor shall meet or exceed all requirements for the cable system described in this document.

1.03 REGULATORY REFERENCES

- A. All work and materials shall conform in every detail to the rules and requirements of the National Fire Protection Association, the local Electrical Code and present manufacturing standards.
- B. All materials shall be UL Listed and shall be marked as such. If UL has no published standards for a particular item, then other national independent testing standards shall apply and such items shall bear those labels. Where UL has an applicable system listing and label, the entire system shall be so labeled.

- C. All modular jacks, patch cords, consolidation point, and patch cords performance shall be verified (not just tested) by a third party to be category 6 component and channel compliant.
- D. The cabling system described in this is derived from the recommendations made in recognized telecommunications industry standards. The following documents are incorporated by reference:
 - 1. ANSI/TIA/EIA - 568-C.0, Generic Telecommunications Cabling for Customer Premises
 - 2. ANSI/TIA/EIA - 568-C.1, Commercial Building Telecommunications Cabling Standard.
 - 3. ANSI/TIA/EIA - 568-C.2, Balanced Twisted Pair Cabling Components, Addendum 1 –
 - 4. ANSI/TIA/EIA - 568-C.3, Optical Fiber Cabling Components
 - 5. ANSI/TIA/EIA – 569-A, Commercial Building Standard for Telecommunications Pathways and Spaces, February, 1998.
 - 6. ANSI/TIA/EIA – 606-A, Administration Standard for Telecommunications Infrastructure of Commercial Buildings, February, 2002.
 - 7. ANSI/TIA/EIA – 607-A, Commercial Building Grounding and Bonding Requirements for Telecommunications, August, 1994.
 - 8. ANSI/ TIA/EIA – 758, Customer-Owned Outside Plant Telecommunications Cabling Standard, April 1999.
 - 9. BICSI - TDMM, Building Industries Consulting Services International, Telecommunications Distribution Methods Manual (TDMM) – 10th Edition, 2003.
 - 10. National Fire Protection Agency (NFPA – 70), National Electrical Code (NEC) –2002.
- E. If this document and any of the documents listed above are in conflict, then the more stringent requirement shall apply. All documents listed are believed to be the most current releases of the documents. The Contractor has the responsibility to determine and adhere to the most recent release when developing the proposal for installation.
- F. This document does not replace any code, either partially or wholly. The contractor must be aware of local codes that may impact this project.

1.04 APPROVED CONTRACTOR

- A. The Telecommunications Contractor must be a Certified Installer for the products and/or system being supplied. A copy of certification documents must be submitted with the quote in order for such quote to be valid. The Telecommunications contractor is responsible for workmanship and installation practices in accordance with said certification. At least (1) for every (3) members of the copper installation and termination crew must be certified to a Technician Level of training by the product manufacturer or BICSI. At least (1) for every (5) members of the optical fiber installation and termination crew must be certified by the product manufacturer or other approved organizations in Optical Fiber installation and termination practices.

1.05 WORK INCLUDED

- A. The work included under this specification consists of furnishing all labor, equipment, materials, and supplies and performing all operations necessary to complete the installation of this structured cabling system in compliance with the specifications and drawings. The Telecommunications contractor will provide and install all of the required material to form a complete system.

- B. The work shall include, but not be limited to the following:
 - 1. Furnish and install a complete telecommunications wiring infrastructure as described on the plans and in these specifications.
 - 2. Furnish, install, and terminate all UTP and Optical Fiber cable.
 - 3. Furnish and install all wall plates, jacks, patch panels, and patch cords.
 - 4. Furnish and install all required cabinets and/or racks as required and as indicated.
 - 5. Furnish any other material required to form a complete system.
 - 6. Perform link testing (100% of horizontal and/or backbone links) and certification of all components.
 - 7. Furnish test results of all cabling to the owner on disk and paper format, listed by each closet, then by workstation ID.
 - 8. Adhere and comply with all requirements of the product certification programs.
 - 9. Provide owner training and documentation. (Testing documentation and As-built drawings).

1.06 SUBMITTALS

- A. Under the provisions of this request for proposal, prior to the start of work the telecommunications contractor shall:
 - 1. Submit copies of the certification of the company and names of staff that will be performing the installation and termination of the installation to provide proof of compliance of this spec.
 - 2. Submit proof from manufacturer of contractor's good standing in manufacturer's program.
 - 3. Submit appropriate cut sheets and samples for all products, hardware and cabling.
- B. Work shall not proceed without the Owner's approval of the submitted items.
- C. The telecommunications contractor shall receive approval from the Owners on all substitutions of material. No substituted materials shall be installed except by written approval from the Owner.

1.07 QUALITY ASSURANCE

- A. The telecommunications contractor shall staff the project with qualified personnel. All products shall be new and in good condition.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Delivery and receipt of products shall be at the site described in the Scope Section.
- B. Cable shall be stored according to manufacturer's recommendations as a minimum. In addition, cable must be stored in a location protected from vandalism and weather. If cable is stored outside, it must be covered with opaque plastic or canvas with provision for ventilation to prevent condensation and for protection from weather. If air temperature at cable storage location will be below 40 degrees F., the cable shall be moved to a heated (50 degrees F. minimum) location. If necessary, cable shall be stored off site at the contractor's expense.

- C. If the telecommunications contractor wishes to have a trailer on site for storage of materials, arrangements shall be made with the Owner.

1.09 DRAWINGS

- A. It shall be understood that the electrical details and drawings provided with the specification package are diagrammatic. They are included to show the intent of the specifications and to aid the telecommunications contractor in bidding the job. The telecommunications contractor shall make allowance in the bid proposal to cover whatever work is required to comply with the intent of the plans and specifications.
- B. The telecommunications contractor shall verify all dimensions at the site and be responsible for their accuracy.
- C. Prior to submitting the bid, the telecommunications contractor shall call the attention of the Engineer to any materials or apparatus the telecommunications contractor believes to be inadequate and to any necessary items of work omitted.

PART 2 - PRODUCTS

2.01 EQUIVALENT PRODUCTS

- A. The Owner and engineer have selected specific products that achieve the desired level of performance and preference. The project has been designed around said products. Proposed substitutions must demonstrate equivalent performance in all areas to the satisfaction of the Owner and must be submitted for review at least 10 days prior to bid. The Owner shall not be required to entertain substitutions submitted after bid.

2.02 WORK AREA OUTLETS

- A. Work area cables shall each be terminated at their designated work area location in the connector types described in the subsections below. Included are modular telecommunication jacks. These connector assemblies shall snap into a faceplate.
- B. The Telecommunications Outlet Assembly shall accommodate:
 - 1. Additional accommodations for specific locations as noted in the plans for optical fiber and/or additional copper cables as necessary.
 - 2. A blank filler will be installed when extra ports are not used.
 - 3. All modular jacks shall have their circuit number on the faceplate identifier strip.
 - 4. Multiple jacks that are identified in close proximity on the drawings (but not separated by a physical barrier) may be combined in a single assembly. The telecommunications contractor shall be responsible for determining the optimum compliant configuration based on the products proposed.
 - 5. The same orientation and positioning of jacks and connectors shall be utilized throughout the installation. Prior to installation, the telecommunications contractor shall submit the proposed configuration for each outlet assembly for review by the Owner.

6. The modular jack shall incorporate printed label strip on the dust cap module for identifying the outlet. Printed labels shall be permanent and compliant with ANSI/TIA/EIA-606-A standard specifications. Labels shall be printed using a printer such as a Brady hand held printer. Hand printed labels shall not be accepted.
- C. Faceplates: The faceplates shall:
1. Be as appropriate to fit the modular jack used.
 2. Be UL listed and CSA certified.
 3. Be constructed of high impact, ABS plastic UL 94V-0 construction (except where noted otherwise).
 4. Shall match the faceplate color used for other utilities in the building or match the color of the raceway if installed in surface raceway.
 5. Be compliant with the above requirements along with the following when incorporating optical fiber:
 - a. Be a low profile assembly,
 - b. Incorporate a mechanism for storage of cable and fiber slack needed for termination,
 - c. Position the fiber optic couplings to face downward or at a downward angle to prevent contamination and,
 - d. Incorporate a shroud that protects the optical couplings from impact damage.
 6. Be available as single-gang or dual-gang.
 7. Provide easy access for adds, moves, and changes by front removal of jack modules.
 8. Possess recessed designation windows to facilitate labeling and identification.
 9. Include a clear plastic cover to protect labels in the designation window.
 10. Have mounting screws located under recessed designation windows.
 11. Comply with ANSI/TIA/EIA-606-A work area labeling standard.
 12. Allow for the UTP modules to be inverted in place for termination purposes.
 13. Be manufactured by an ISO 9001 registered company.
- D. Voice / Data Jacks
1. Voice/Data jacks shall be 8-position modular jacks and shall be Category 6 performance as defined by the references in this document including ANSI/TIA/EIA-568-C.2. All pair combinations must be considered, with the worst-case measurement being the basis for compliance. Modular jack performance shall be third-party verified by a nationally recognized independent testing laboratory.
 2. The modular jack shall use dual reactance modular contact array.
 3. The modular jack shall be both component, link and channel compliant to category specifications in ANSI/TIA/EIA-568-C.
 4. The modular jack's performance shall be third-party verified to ANSI/TIA/EIA-568-C Category 6 specifications.
 5. The modular jack shall have low emission IDC contacts.
 6. The modular jack shall use standard termination practice using 110 impact tool.
 7. The modular jack shall be backwards compatible to Category 3, 5, and 5e.
 8. The modular jack shall be center tuned to category 6 test specifications.
 9. Dust covers shall be used on each termination.

2.03 110 COPPER TERMINATION BLOCK

- A. The voice cross connect shall be a passive connection between the horizontal termination blocks and the backbone termination blocks. The wall mount frames shall be field terminated kits including all blocks, connecting blocks, and designation strips. Management rings shall be mounted between vertical columns of blocks to provide management of cross-connect wire. Backbone and horizontal blocks shall use 4-pair connecting blocks. Blocks shall be oriented so that backbone terminations are located on the left and horizontal frames are located on the right of the termination field when facing the frame assembly.
- B. 110 Block Kits shall:
 - 1. Include both the wiring block in a 50, 100 and 300 pair (as applicable) footprint and the connecting block.
 - 2. Be manufactured using fire retardant molded plastic.
 - 3. Support termination of 22-24 AWG solid conductor.
 - 4. Contain back openings for the feed through of cable.
 - 5. Meet category 6 component compliance and be verified by a third-party nationally recognized independent testing laboratory.
 - 6. Have color-coded tips on the wiring block and color-coding on the connector blocks for installation identification.
 - 7. Use standard termination practice requiring a single conductor 110 impact tool.
 - 8. Termination hardware shall maintain the paired construction of the cable to facilitate minimum untwisting of the wires.
 - 9. Be backwards compatible to category 3, 5 and 5e.
 - 10. Be labeled in compliance with ANSI/TIA/EIA-606-A labeling specifications using permanent labels and LabelMo software (or other labeling software/printer).
 - 11. Be manufactured by an ISO 9001 registered company.
- C. 110 Cross-Connect System Backboard Channels shall:
 - 1. Be available in 300 and 900 pair sizes.
 - 2. Allow the mounting of 110 100-pair blocks without legs.
 - 3. Include bottom trough and grounding bar.
 - 4. Be wall mountable.
 - 5. Be of cold roll steel construction.
 - 6. Be manufactured by an ISO 9001 registered company.
- D. 110 Wall Mount Vertical Trough shall:
 - 1. Be available in single channel or dual channel configurations.
 - 2. In dual channel configuration shall be used to provide separation for different wiring media.
 - 3. Be available in 300 pair and 900 pair sizes.
 - 4. Be wall mountable.
 - 5. Be used with wall mountable backboard channels. Acceptable configurations include a 300 pair and a 900 pair.
 - 6. Be of cold roll steel construction.
 - 7. Be manufactured by an ISO 9001 registered company.

2.04 MODULAR PATCH PANELS

- A. The Modular Patch Panels shall:
1. Meet category 6 component compliance and be verified by a third-party nationally recognized independent testing laboratory.
 2. Use low emission IDC contacts.
 3. Use dual reactance technology to enhance the signal-to-noise ratio.
 4. Require standard termination practices using a 110 impact tool.
 5. Use a single piece IDC housing designed to accept larger Category 6 conductors.
 6. Support both T568B and T568A wiring.
 7. Include easy to follow wiring labels.
 8. Include label fields.
 9. Allow for the use of icons.
 10. Include full length metal rear cable management.
 11. Be available in standard or high density.
 12. Be backward compatible to category 3, 5 and 5e.
 13. Be center tuned to category 6 test specifications.

2.05 RACKS

- A. All racks and wire management shall be of one manufacturer or designed specifically to work together. The equipment rack shall provide vertical cable management and support for the patch cords at the front of the rack and wire management, support, and protection for the horizontal cables inside the legs of the rack. Waterfall cable management shall be provided at the top of the rack for patch cords and for horizontal cables entering the rack channels for protection and to maintain proper bend radius and cable support. Wire management shall also be mounted above each patch panel and/or piece of equipment on the rack. The rack shall include mounting brackets for cable tray ladder rack to mount to the top of the rack. Velcro cable ties shall be provided inside the rack channels to support the horizontal cable. Rack shall be black in color to match the patch panels and cable management.
- B. Free-Standing Rack
1. Free-standing rack shall:
 - a. Provide the necessary strain relief, bend radius and cable routing for proper installation of high performance cross connect products, meeting all specifications of ANSI/TIA/EIA-568-C.
 - 1) Rear channels to securely route distribution cables.
 - 2) Vertical management “cage” to protect patch cords while allowing easy access for moves, adds and change with individual 1-rack unit fingers and double hinged door.
 - 3) Include speednuts to reduce assembly time.
 - b. Have top cable trough with waterfall and built in patch/horizontal cable distribution separator.
 - c. Have EIA hole pattern on front and rear.
 - d. Have rack units stamped on the front, on both sides allowing numbering from top-to-bottom or bottom-to-top.
 - e. Be available with a 10.5” or 16.25” channel depth.
 - f. Be available with hook and loop straps for securing bulk cables inside the vertical U-channels.

- g. Assemble as 19" (483 mm) or 23" (584 mm) with no additional hardware.
- h. Be available with three styles of vertical patch cord management: interbay with latches, cable management rings, or fingerduct with covers.
- i. Provide floor and ceiling access for cable management and distribution.
- j. Provide pre-drilled base for floor attachment of rack.
- k. Be available in a 7 foot version (45 rack units) or an 8 foot version (51 rack units).
- l. Be available in standard color of black.
- m. Be manufactured by an ISO 9001 registered company.

2.06 HORIZONTAL DISTRIBUTION CABLE

- A. All horizontal data station cable and voice cable shall terminate on modular patch panels (copper or fiber), 110 cross-connecting blocks (copper), or patch/splice cabinets (fiber) in their respective Telecommunications Room or Equipment Room as specified on the drawings.
- B. 100 OHM Category 6 UNSHIELDED TWISTED PAIR CABLE (UTP)
 - 1. Physical Characteristics:
 - a. Shall be plenum rated and meet applicable requirements of ANSI/ICEA S-80-576. All 4 pairs must be insulated with F.E.P. No 2 x 2 or 3 x 1 constructions will be allowed.
 - b. The diameter of the insulated conductor shall be .023 in. maximum.
 - c. Shall consist of (4) twisted pairs.
 - d. Shall be suitable for the environment in which they are to be installed.
 - e. The color coding of pairs shall be:

Pair 1	Pair 2	Pair 3	Pair 4
W-BL; BL	W-O; OW-G;	GW-BR;	BR
 - f. The overall diameter of the cable shall be 0.2150" nominal.
 - g. The ultimate breaking strength measured in accordance with ASTM D 4565 shall be 400 N minimum.
 - h. Cable shall withstand a bend radius of 1" at -20 degrees Celsius without jacket or insulation cracking.
 - i. Cable shall be third party verified to meet ANSI/TIA/EIA-568-C.2.
 - 2. Transmission Characteristics:
 - a. DC resistance of any conductor shall not exceed 9.38 Ohms per 100m max. at 20°C. Measured in accordance with ASTM D 4566.
 - b. The mutual capacitance of any pair at 1 kHz for 100m of cable shall not exceed 4.4 Nf.
 - c. DC resistance unbalance between any two conductors of any pair shall not exceed 3% when measured at or corrected to 20°C in accordance with ASTM D 4566.
 - d. The capacitance unbalance to ground at 1 kHz of any pair shall not exceed 330 pF per 100m.
 - 3. Cable shall be Berk-Tek LANmark-1000 UTP (Plenum) or approved equal.
 - 4. Cable installed underground/below slab in conduit shall be Berk-Tek LANmark-6 OSP (wet location) or approved equal.

2.07 FIBER OPTIC CABLE

- A. Indoor/Outdoor Optical Fiber Non-Conductive Plenum (OFNP) Loose Tube With Laser Enhanced 62.5/125 Optical Fibers
1. Each Multimode Fiber shall be:
 - a. Graded-index optical fiber wave-guide with nominal 62.5/125µm-core/cladding diameter.
 - b. The fiber shall comply with the latest revision of ANSI/EIA/TIA-4920000.
 - c. Attenuation shall be measured in accordance with ANSI/EIA/TIA-455-46, 53 or 61.
 - d. Information transmission capacity shall be measured in accordance with the latest revision of ANSI/EIA/TIA-455—204.
 - e. The measurements shall be performed at 23 degrees C +/- 5 degrees.
 - f. Maximum attenuation dB/Km @ 850/1300 nm: 3.5/1.0.
 - g. Bandwidth 200 MHz-km @ 850nm.
 - h. Bandwidth 500 MHz-km @ 1300nm.
 - i. Optical Fiber shall be laser optimized and guarantee Gigabit Ethernet distances of 500m/1000m for 850nm and 1300nm respectively
 2. Physical Characteristics:
 - a. Shall be suitable for use in both outdoor and indoor applications without the use of a transition at the building entrance.
 - b. Shall be suitable for use in risers, plenums and horizontal applications.
 - c. Shall have a dry water blocking system for cable core and buffer tubes.
 - d. Shall be available with a fiber strand count range from 6 to 144.
 - e. Shall have a 3.0 mm sub-unit diameter.
 - f. Shall have and be marked with an UL-OFNP and OFN FT6 Flame Rating.
 - g. Shall comply with the requirements of ICEA S-83-596 & ANSI/ICEA S-87-640.
 - h. Strength members shall be dielectric and may be either fiberglass or aramid yarn.
 - i. Suitable for underground or aboveground conduits.
 - j. Loose Tube fibers shall be color coded in accordance with EIA / TIA 598 with an overall blue jacket.
 - k. Shall have a ripcord for overall jacket.
 - l. Suitable for operation between -40° to +75° C.
 - m. Shall be UV resistant.
 - n. Shall be of an all dielectric design.
 3. Design Make:
 - a. Berk-Tek Adventum optical fiber cable with GIGAlite 62.5/125 micron fiber or approved equal.
- B. Indoor/Outdoor Optical Fiber Non-Conductive Plenum (OFNP) Loose Tube With Laser Enhanced 50/125 Optical Fibers
1. Each Multimode Fiber shall be:
 - a. Graded-index optical fiber wave-guide with nominal 50/125µm-core/cladding diameter.
 - b. The fiber shall comply with the latest revision of ANSI/EIA/TIA-4920000.
 - c. Attenuation shall be measured in accordance with ANSI/EIA/TIA-455-46, 53 or 61.
 - d. Information transmission capacity shall be measured in accordance with the latest revision of ANSI/EIA/TIA-455—204.
 - e. The measurements shall be performed at 23 degrees C +/- 5 degrees.

- f. Maximum attenuation dB/Km @ 850/1300 nm: 3.5/1.5.
 - g. Bandwidth 700 MHz-km @ 850nm.
 - h. Bandwidth 500 MHz-km @ 1300nm.
 - i. Optical Fiber shall be laser optimized and guarantee Gigabit Ethernet distances of 750m/600m for 850nm and 1300nm respectively
- 2. Physical Characteristics:
 - a. Shall be suitable for use in both outdoor and indoor applications without the use of a transition at the building entrance.
 - b. Shall be suitable for use in risers, plenums and horizontal applications.
 - c. Shall have a dry water blocking system for cable core and buffer tubes.
 - d. Shall be available with a fiber strand count range from 6 to 72.
 - e. Shall have a 3.0 mm sub-unit diameter.
 - f. Shall have and be marked with an UL-OFNP and OFN FT6 Flame Rating.
 - g. Shall comply with the requirements of ICEA S-83-596 & ANSI/ICEA S-87-640.
 - h. Strength members shall be dielectric and may be either fiberglass or aramid yarn.
 - i. Suitable for underground or aboveground conduits.
 - j. Loose Tube fibers shall be color coded in accordance with EIA / TIA 598 with an overall dark blue jacket.
 - k. Shall have a ripcord for overall jacket.
 - l. Suitable for operation between -40° to +75° C.
 - m. Shall be UV resistant.
 - n. Shall be of an all dielectric design.
 - o. Shall have a maximum installation tension of 300 lbs for cables without dielectric strength member and 600 lbs for cables with dielectric strength members.
- 3. Design Make:
 - a. Berk-Tek Adventum optical fiber cable with GIGAlite 50/125 micron fiber or approved equal.

2.08 FIBER OPTIC CONNECTORS

A. ST Fiber Optic Connectors

- 1. Each field-terminated ST Fiber Connector shall:
 - a. Be a pre-polished fiber connector with a fiber stub or a field polish fiber connector.
 - b. Be available in singlemode and multimode (62.5 um and 50 um) versions.
 - c. Have a domed zirconia ferrule.
 - d. Have a PC polish.
 - e. Accept a nominal fiber diameter of 125 micrometers.
 - f. Have a typical insertion loss of 0.3 dB for multimode and 0.2 dB for singlemode.
 - g. Have repairable tips.
 - h. Have an insertion loss change of less than 0.2 dB after 500 reconnects.
 - i. Be stable over an operating range of -40C to +75 degrees C.
- 2. Design Make:
 - a. Nexans ST/Ortronics ST Fiber Optic Connectors or approved equal.

B. LC Fiber Optic Connectors

- 1. Each LC Fiber Connector shall:
 - a. Be a pre-polished fiber connector with a fiber stub or field-polish fiber connector.
 - b. Be available in single mode and multimode versions.
 - c. Have a domed zirconia ferrule.

- d. Be a PC polish type connector.
 - e. Accept a nominal fiber diameter of 125 micrometers.
 - f. Have a typical insertion loss of 0.1 dB for multimode and 0.1 dB for single mode.
 - g. Have repairable tips.
 - h. Have an insertion loss change of less than 0.2 dB after 500 reconnects.
 - i. Be stable over an operating range of -40C to +75 degrees C.
 - 2. Design Make:
 - a. Nexans/Ortronics LC Fiber Optic Connectors or approved equal.
- C. SC Fiber Optic Connectors
- 1. Each SC Fiber Connector shall:
 - a. Be a pre-polished fiber connector with a fiber stub or a field-polish fiber connector.
 - b. Be available in single mode and multimode versions.
 - c. Have a domed zirconia ferrule.
 - d. Be a PC polish or pre-polished type connector.
 - e. Accept a nominal fiber diameter of 125 micrometers.
 - f. Have a typical insertion loss of 0.1 dB for multimode and 0.1 dB for single mode.
 - g. Have repairable tips.
 - h. Have an insertion loss change of less than 0.2 dB after 500 reconnects.
 - i. Be stable over an operating range of -40C to +75 degrees C.
 - 2. Design Make:
 - a. Nexans/Ortronics SC Fiber Optic Connectors or approved equal.

2.09 COPPER CABLE PROTECTION UNITS

- A. All copper circuits shall be provided with protection between each building with an entrance cable protector panel. All building-to-building circuits shall be routed through this protector. The protector shall be connected with a #6 AWG copper bonding conductor between the protector ground lug and the TC ground point. Approved manufacturer of protection units is Porta Systems.

2.10 PATCH CORDS

- A. The contractor shall provide factory terminated and tested UTP and optical fiber patch cords and equipment cords for the complete cabling system. The UTP patch cables shall meet the requirements of ANSI/TIA/EIA-568-B for patch cord testing.
- B. Copper (UTP) patch cords shall:
 - 1. Use 8-position connector with impedance matched contacts and designed using dual reactance.
 - 2. Be constructed of 100 ohm, 4 pair stranded conductor, unshielded twisted pair copper per the requirements of the ANSI/TIA/EIA-568-B.2 and ANSI/TIA/EIA-568-B.2-1 standard.
 - 3. Meet TIA category 6 component specifications in ANSI/TIA/EIA-568-B.2-1
 - 4. 100% factory tested to meet category 6 performance and
 - 5. ETL or any other nationally recognized 3rd party verification
 - 6. Be center tuned to category 6 performance specifications by using paired bi-level contact array.
 - 7. Be capable of universal T568A or T568B wiring schemes.

8. Modular connector shall maintain the paired construction of the cable to facilitate minimum untwisting of the wires.
 9. Have a performance marking indelibly labeled on the jacket (by the manufacturer).
 10. Have the ability to accept color-coded labels and icons to comply with ANSI/TIA/EIA-606-A labeling specifications.
 11. Have “snagless” protection for the locking tab to prevent snagging and to protect locking tab in tight locations and provide bend relief.
 12. Be available in three standard colors.
 13. Be available in 3 foot, 5 foot, 7 foot, 9 foot, and 15 foot standard lengths.
 14. Be backwards compatible to Category 3, 5 and 5e.
 15. Be manufactured by an ISO 9001 registered company.
- C. Optical Fiber patch cords shall:
1. Contain two (2) multi-mode optical fibers.
 2. Use multi-mode, graded-index fibers with a 62.5 micron core.
 3. Be capable of transmission at both 850 nm and 1300 nm wavelengths.
 4. Include listing of actual loss of patchcord when packaged.
 5. Be manufactured in standard lengths of 1 m (3.27 ft), 2 m (6.56 ft), 3 m (9.84 ft), 4 m (13.11 ft), 7 m (22.95 ft), and 10 m (32.79 ft), and special ordered in any other lengths.
 6. Be manufactured by an ISO 9001 registered company.

2.11 GROUNDING AND BONDING

- A. The facility shall be equipped with a Telecommunications Bonding Backbone (TBB). This backbone shall be used to ground all telecommunications cable shields, equipment, racks, cabinets, raceways, and other associated hardware that has the potential to act as a current carrying conductor. The TBB shall be installed independent of the building’s electrical and building ground and shall be designed in accordance with the recommendations contained in the ANSI/TIA/EIA-607 Telecommunications Bonding and Grounding Standard.
- B. The main entrance facility/equipment room in each building shall be equipped with a telecommunications main grounding bus bar (TMGB). Each telecommunications room shall be provided with a telecommunications ground bus bar (TGB). The TMGB shall be connected to the building electrical entrance grounding facility. The intent of this system is to provide a grounding system that is equal in potential to the building electrical ground system. Therefore, ground loop current potential is minimized between telecommunications equipment and the electrical system to which it is attached.
- C. All racks, metallic backboards, cable sheaths, metallic strength members, splice cases, cable trays, ungrounded conduits, etc. entering or residing in the TR or ER shall be grounded to the respective TGB or TMGB using a minimum #6 AWG stranded copper bonding conductor and compression connectors.
- D. All wires used for telecommunications grounding purposes shall be identified with a green insulation. Non-insulated wires shall be identified at each termination point with a wrap of green tape. All cables and bus bars shall be identified and labeled in accordance with the System Documentation Section of this specification.

2.12 FIRESTOP

- A. A firestop system is comprised of the item or items penetrating the fire rated structure, the opening in the structure and the materials and assembly of the materials used to seal the penetrated structure. Firestop systems comprise an effective block for fire, smoke, heat, vapor and pressurized water stream.
- B. All penetrations through fire-rated building structures (walls and floors) shall be sealed with an appropriate firestop system. This requirement applies to through penetrations (complete penetration) and membrane penetrations (through one side of a hollow fire rated structure). Any penetrating item i.e., riser slots and sleeves, cables, conduit, cable tray, and raceways, etc. shall be properly firestopped.
- C. Firestop systems shall be UL Classified to ASTM E814 (UL 1479) and shall be approved by a qualified Professional Engineer (PE), licensed (actual or reciprocal) in the state where the work is to be performed. A drawing showing the proposed firestop system, stamped/embossed by the PE shall be provided to the Owner's Technical Representative prior to installing the firestop system(s).

PART 3 - EXECUTION

3.01 WORK AREA OUTLETS

- A. Cables shall be coiled in the in-wall or surface-mount boxes if adequate space is present to house the cable coil without exceeding the manufacturer's bend radius. In hollow wall installations where box-eliminators are used, excess wire can be stored in the wall. No more than 12" of UTP and 12" of fiber slack shall be stored in an in-wall box, modular furniture raceway, or insulated walls. Excess slack shall be loosely coiled and stored in the ceiling above each drop location when there is not enough space present in the outlet box to store slack cable.
- B. Cables shall be dressed and terminated in accordance with the recommendations made in the ANSI/TIA/EIA-568-C.0 document, manufacturer's recommendations and best industry practices.
- C. Pair untwist at the termination shall not exceed 12 mm (one-half inch).
- D. Bend radius of the horizontal cable shall not be less than 4 times the outside diameter of the UTP cable.
- E. The cable jacket shall be maintained to within 25mm (one inch) of the termination point.
- F. Data jacks, unless otherwise noted in drawings, shall be located in the bottom position(s) of each faceplate. Data jacks in horizontally oriented faceplates shall occupy the right-most position(s).
- G. Voice jacks shall occupy the top position(s) on the faceplate. Voice jacks in horizontally oriented faceplates shall occupy the left-most position(s).

3.02 HORIZONTAL DISTRIBUTION CABLE INSTALLATION

- A. Cable shall be installed in accordance with manufacturer's recommendations and best industry practices.
- B. A pull cord (nylon; 1/8" minimum) shall be co-installed with all cable installed in any conduit.
- C. Cable raceways shall not be filled greater than the ANSI/TIA/EIA-569-A maximum fill for the particular raceway type or 40%.
- D. Cables shall be installed in continuous lengths from origin to destination (no splices) except for transition points, or consolidation points.
- E. Where transition points, or consolidation points are allowed, they shall be located in accessible locations and housed in an enclosure intended and suitable for the purpose.
- F. The cable's minimum bend radius and maximum pulling tension shall not be exceeded.
- G. If a J-hook or trapeze system is used to support cable bundles all horizontal cables shall be supported at a maximum of 48 to 60 inch (1.2 to 1.5 meter) intervals. At no point shall cable(s) rest on acoustic ceiling grids or panels.
- H. Horizontal distribution cables shall be bundled in groups of no more than 50 cables. Cable bundle quantities in excess of 50 cables may cause deformation of the bottom cables within the bundle and degrade cable performance.
- I. Cable shall be installed above fire-sprinkler systems and shall not be attached to the system or any ancillary equipment or hardware. The cable system and support hardware shall be installed so that it does not obscure any valves, fire alarm conduit, boxes, or other control devices.
- J. Cables shall not be attached to ceiling grid or lighting fixture wires. Where support for horizontal cable is required, the contractor shall install appropriate carriers to support the cabling.
- K. Any cable damaged or exceeding recommended installation parameters during installation shall be replaced by the contractor prior to final acceptance at no cost to the Owner.
- L. Cables shall be identified by a self-adhesive label in accordance with the System Documentation Section of this specification and ANSI/TIA/EIA-606-A. The cable label shall be applied to the cable behind the faceplate on a section of cable that can be accessed by removing the cover plate.
- M. Unshielded twisted pair cable shall be installed so that there are no bends smaller than four times the cable outside diameter at any point in the run and at the termination field.
- N. Pulling tension on 4-pair UTP cables shall not exceed 25-lbf for a four-pair UTP cable.
- O. Cables installed underground or below slab shall be suitable for use in wet locations and outdoors in duct or conduit. If wet location cable is exposed in the building after exiting the wet area, it must transition to an appropriate category dry cable within 50 feet (15M) of exiting conduit.

3.03 HORIZONTAL COPPER TERMINATION AND INSTALLATION

- A. Cables shall be dressed and terminated in accordance with the recommendations made in the ANSI/TIA/EIA-568-C standard, manufacturer's recommendations and best industry practices.
- B. Pair untwist at the termination shall not exceed 13 mm (0.5 inch).
- C. Bend radius of the cable in the termination area shall not exceed 4 times the outside diameter of the cable.
- D. Cables shall be neatly bundled and dressed to their respective panels or blocks. Each panel or block shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack or frame.
- E. The cable jacket shall be maintained as close as possible (within 25mm – 1 inch) to the termination point.
- F. Each cable shall be clearly labeled on the cable jacket behind the patch panel at a location that can be viewed without removing the bundle support ties. Cables labeled within the bundle, where the label is obscured from view shall not be acceptable.

3.04 OPTICAL FIBER TERMINATION HARDWARE

- A. Fiber slack shall be neatly coiled within the fiber splice tray or enclosure. No slack loops shall be allowed external to the fiber panel.
- B. Each cable shall be individually attached to the respective splice enclosure by mechanical means. The cables strength member shall be securely attached the cable strain relief bracket in the enclosure.
- C. Each fiber bundle shall be stripped upon entering the splice tray and the individual fibers routed in the splice tray.
- D. Each cable shall be clearly labeled at the entrance to the splice enclosure. Cables labeled within the bundle shall not be acceptable.
- E. A maximum of 12 strands of fiber shall be spliced in each tray.
- F. All spare strands shall be installed into spare splice trays.

3.05 BACKBONE CABLE INSTALLATION

- A. Backbone cables shall be installed separately from horizontal distribution cables
- B. A pull cord (nylon; 1/8" minimum) shall be co-installed with all cable installed in any conduit.
- C. Where cables are housed in conduits, the backbone and horizontal cables shall be installed in separate conduits

- D. Where backbone cables are installed in an air return plenum, riser rated cable shall be installed in metallic conduit.
- E. Where backbone cables and distribution cables are installed in a cable tray or wireway, backbone cables shall be installed first and bundled separately from the horizontal distribution cables.
- F. All backbone cables shall be securely fastened to the sidewall of the TR on each floor.
- G. Backbone cables spanning more than three floors shall be securely attached at the top of the cable run with a wire mesh grip and on alternating floors or as required by local codes.
- H. Vertical runs of cable shall be supported to messenger strand, cable ladder, or other method to provide proper support for the weight of the cable.
- I. Large bundles of cables and/or heavy cables shall be attached using metal clamps and/or metal banding to support the cables.

3.06 RACKS

- A. Racks shall be securely attached to the concrete floor using a minimum 3/8" hardware or as required by local codes.
- B. Racks shall be placed with a minimum of 36-inch clearance from the walls on all sides of the rack. When mounted in a row, maintain a minimum of 36 inches from the wall behind and in front of the row of racks and from the wall at each end of the row.
- C. All racks shall be grounded to the telecommunications ground bus bar in accordance with Section 9.0 of this document.
- D. Rack mount screws not used for installing patch panels and other hardware shall be bagged and left with the rack upon completion of the installation.
- E. Wall mounted termination block fields shall be mounted on 4' x 8' x .75" void free plywood. The plywood shall be mounted vertically 12" above the finished floor. The plywood shall be painted with two coats of white fire retardant paint.
- F. Wall mounted termination block fields shall be installed with the lowest edge of the mounting frame 18" from the finished floor.

3.07 FIRESTOP SYSTEM

- A. All firestop systems shall be installed in accordance with the manufacturer's recommendations and shall be completely installed and available for inspection by the local inspection authorities prior to cable system acceptance.

3.08 GROUNDING SYSTEM

- A. The TBB shall be designed and/or approved by a qualified PE, licensed in the state that the work is to be performed. The TBB shall adhere to the recommendations of the ANSI/TIA/EIA-607 standard, and shall be installed in accordance with best industry practice.
- B. Installation and termination of the main bonding conductor to the building service entrance ground shall be performed by a licensed electrical contractor.

3.09 IDENTIFICATION AND LABELING

- A. The contractor shall develop and submit for approval a labeling system for the cable installation. The Owner will negotiate an appropriate labeling scheme with the successful contractor. At a minimum, the labeling system shall clearly identify all components of the system: racks, cables, panels and outlets. The labeling system shall designate the cables origin and destination and a unique identifier for the cable within the system. Racks and patch panels shall be labeled to identify the location within the cable system infrastructure. All labeling information shall be recorded on the as-built drawings and all test documents shall reflect the appropriate labeling scheme. Labeling shall follow the guidelines of ANSI/TIA/EIA-606-A.
- B. Outside Plant cables passing through a pull box or vault shall have a cable label that is water and mud proof.
- C. All label printing will be machine generated by Ortronics LabelMo, or similar software, using indelible ink ribbons or cartridges. Self-laminating labels will be used on cable jackets, appropriately sized to the OD of the cable, and placed within view at the termination point on each end. Outlet, patch panel and wiring block labels shall be installed on, or in, the space provided on the device.

3.10 TESTING AND ACCEPTANCE

- A. General
 - 1. All cables and termination hardware shall be 100% tested for defects in installation and to verify cabling system performance under installed conditions according to the requirements of ANSI/TIA/EIA-568-B. All pairs of each installed cable shall be verified prior to system acceptance. Any defect in the cabling system installation including but not limited to cable, connectors, feed through couplers, patch panels, and connector blocks shall be repaired or replaced in order to ensure 100% useable conductors in all cables installed.
 - 2. All cables shall be tested in accordance with this document, the ANSI/TIA/EIA standards, the Certification Program Information Manual provided by the product manufacturer and best industry practice. If any of these are in conflict, the Contractor shall bring any discrepancies to the attention of the project team for clarification and resolution.
- B. Copper Link Testing

1. All twisted-pair copper cable links shall be tested for continuity, pair reversals, shorts, opens and performance as indicated below. Additional testing is required to verify Category performance.
2. Horizontal cabling shall be tested using a Level III test unit for category 6 performance compliance.
3. The basic tests required are:
 - a. Wire Map
 - b. Length
 - c. Attenuation
 - d. NEXT (Near end crosstalk)
 - e. Return Loss
 - f. ELFEXT Loss
 - g. Propagation Delay
 - h. Delay skew
 - i. PSNEXT (Power sum near-end crosstalk loss)
 - j. PSELFEXT (Power sum equal level far-end crosstalk loss)
4. Continuity - Each pair of each installed cable shall be tested using a test unit that shows opens, shorts, polarity and pair-reversals, crossed pairs and split pairs. Shielded/screened cables shall be tested with a device that verifies shield continuity in addition to the above stated tests. The test shall be recorded as pass/fail as indicated by the test unit 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 prior to final acceptance.
5. Length - Each installed cable link shall be tested for installed length using a 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 ANSI/TIA/EIA-568-C Standard. Cable lengths shall be recorded, referencing the cable identification number and circuit or pair number. For multi-pair cables, the shortest pair length shall be recorded as the length for the cable.
6. Category 6 Performance Shall meet the link requirements outlined below for a 90-meter, 4-connector permanent link.

Frequency (MHz)	Maximum Insertion Loss (dB)	Minimum NEXT (dB)	Minimum PSNEXT (dB)	Minimum ELFEXT (dB)	Minimum PSELFEXT (dB)	Minimum Return Loss (dB)
1.0	2.1	69.0	64.0	65.3	62.3	21.0
4.0	4.0	67.0	62.5	53.2	50.2	21.0
10.0	6.3	60.6	46.0	45.3	42.3	21.0
20.0	9.0	55.6	51.0	39.2	36.2	21.0
31.25	11.3	52.4	47.7	35.4	32.4	19.1
62.5	16.4	47.4	42.6	29.3	26.3	16.1
100.0	21.2	43.9	39.1	25.3	22.3	14.0
155.0	26.6	40.7	35.8	21.4	18.4	12.1
200.0	31.5	38.8	33.9	19.2	16.2	11.0
250.0	36.0	37.1	32.4	17.3	14.3	10.0

C. Fiber Testing

1. All fiber testing shall be performed on all fibers in the completed end-to-end system. Testing shall consist of an end-to-end power meter test performed per EIA/TIA-455-53A. The system loss measurements shall be provided at 850 and/or 1300 nanometers for multimode fibers and 1310 and/or 1550 nanometers for single mode fibers. These tests also include continuity checking of each fiber.
2. Backbone multimode fiber cabling shall be tested at both 850 nm and 1300 nm (or 1310 and 1550 nm for singlemode) in both directions.
3. Test set-up and performance shall be conducted in accordance with ANSI/EIA/TIA-526-14 Standard, Method B.
4. Where links are combined to complete a circuit between devices, the Contractor shall test each link from end to end to ensure the performance of the system. **ONLY LINK TEST IS REQUIRED.** The contractor can optionally install patch cords to complete the circuit and then test the entire channel. The test method shall be the same used for the test described above. The values for calculating loss shall be those defined in the ANSI/TIA/EIA Standard.
5. Attenuation testing shall be performed with an approved hand held tester from an industry recognized test equipment manufacturer.

3.11 SYSTEM DOCUMENTATION

- A. Upon completion of the installation, the telecommunications contractor shall provide three (3) full documentation sets to the Engineer for approval. Documentation shall include the items detailed in the sub-sections below.
- B. Documentation shall be submitted within ten (10) working days of the completion of each testing phase (e.g. subsystem, cable type, area, floor, etc.). This is inclusive of all test result and draft as-built drawings. Draft drawings may include annotations done by hand. Machine generated (final) copies of all drawings shall be submitted within 30 working days of the completion of each testing phase. At the request of the Engineer, the telecommunications contractor shall provide copies of the original test results.
- C. The Engineer may request that a 10% random field re-test be conducted on the cable system, at no additional cost, to verify documented findings. Tests shall be a repeat of those defined above. If findings contradict the documentation submitted by the telecommunications contractor, additional testing can be requested to the extent determined necessary by the Engineer, including a 100% re-test. This re-test shall be at no additional cost to the Owner.

3.12 TEST RESULTS

- A. Test documentation shall be provided on disk within three weeks after the completion of the project. The disk shall be clearly marked on the outside front cover with the words "Project Test Documentation", the project name, and the date of completion (month and year). The results shall include a record of test frequencies, cable type, conductor pair and cable (or outlet) I.D., measurement direction, reference setup, and crew member name(s). The test equipment name, manufacturer, model number, serial number, software version and last calibration date will also be provided at the end of the document. Unless the manufacturer specifies a more frequent calibration cycle, 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 as well as the software version being used in the field test equipment.

- B. The field test equipment shall meet the requirements of ANSI/TIA/EIA-568-C including applicable TSB's and amendments. The appropriate Level III tester shall be used to verify Category 6 cabling systems.
- C. Printouts generated for each cable by the wire (or fiber) test instrument shall be submitted as part of the documentation package. The telecommunications contractor must furnish this information in electronic form CD-ROM). If needed, provide manufacturers software require to read the test results.
- D. 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 documented.

PART 4 - WARRANTY AND SERVICES

4.01 WARRANTY

- A. The manufacturer shall provide the warranty directly to the end-user.
- B. An Extended Product Warranty shall be provided which warrants functionality of all components used in the system for a minimum of 20 years from the date of registration. The Extended Product Warranty shall warrant the installed horizontal and/or backbone copper, and both the horizontal and the backbone optical fiber portions of the cabling system.
- C. The Application Assurance Warranty shall cover the failure of the wiring system to support the applications that are designed for the link/channel specifications of ANSI/TIA/EIA-568-C.0. These applications include, but are not limited to, 10BASE-T, 100BASE-T, 1000BASE-T, 155Mb/sATM, and 1Gb/s ATM.
- D. The contractor shall provide a warranty on the physical installation.

4.02 FINAL ACCEPTANCE AND SYSTEM CERTIFICATION

- A. Completion of the installation, in-progress and final inspections, receipt of the test and as-built documentation, and successful performance of the cabling system for a two-week period will constitute acceptance of the system. Upon successful completion of the installation and subsequent inspection, the end user shall be provided with a numbered certificate, from the product manufacturer, registering the installation.

END OF SECTION 27 1300

SECTION 28 3100
FIRE SPRINKLER MONITORING AND ALARM SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section Includes:
1. Provide a complete sprinkler monitoring and alarm system. The system shall be connected, tested, verified by the Authority Having Jurisdiction (AHJ) to be acceptable and left in first-class operating condition. All equipment herein specified shall be engineer-approved and California State Fire Marshal (CSFM) listed. The entire installation shall conform to the National Fire Protection Association (NFPA) Standard 72, 90A & CEC Article 760 and authorities having jurisdiction as applicable. The system specified and depicted on the plan is a complete and approved system. Substitution of system components or manufacturer will require the contractor to separately obtain approval with the CSFM at Contractor's expense and shall meet all requirements of the system as designed and pre-approved. Any routing of the system wiring that is significantly different than shown on the approved drawings shall have the approval of the engineer and must be obtained prior to construction.
 2. Provide all work and material as shown and / or required to provide a fully functional and adequate system as described herein and as required by the AHJ.
 3. Supervision: The system shall monitor the integrity of all alarm initiating and indicating appliance circuits and provide local and remote status of all connected systems. The system shall be provided with automatically charged standby batteries to maintain system operation for 24 HRS in the normal supervisory mode and 5 minutes of alarm. Batteries shall be supervised for connection to the system and low voltage threshold. The automatic battery charger shall be capable of charging fully discharged system batteries to 100% in 8 hours.
 4. The system wiring and installation shall be as stated in drawings and as required by the manufacturer. All wiring shall be color coded, tagged and verified to assure that it is free from shorts and grounds and shall be rated for the appropriate environmental conditions such as well locations.
 5. Testing: The completed system shall be tested in accordance with NFPA Standard 72-7-1.
 6. Warranty: The equipment and wiring shall be warranted to be free from electrical and mechanical defects for a period of two (2) years commencing with final acceptance by Owner.
 7. All wiring shown in drawings shall be installed in conduit.
 8. System Operation shall include:
 - a. Separate zone signaling and device status indication for all initiating devices.

- b. Audible to sound the California uniform fire alarm signal in temporal mode. Devices shall be at least 15dBA above average ambient sound level, but not less than 75dBA at 10' or more than 120dBA.
 - c. Supervision of all circuits to indicate any abnormal wiring condition.
 - d. One (1) N.O./N.C. integral relay for external device interface or as indicated on drawings.
 - e. Central station connection capable of indicating (3) distinct separate signals as being tamper, trouble and alarm with point reporting capabilities.
9. All work shall be completed as shown on the plans and or as specified within this specification and shall include the following (but is not limited to):
- a. Furnishing and installation of equipment and devices.
 - b. Conductors, connections and interconnections where specified and all in conduit system.
 - c. Testing, cleaning and adjusting of completed work.
 - d. Wiring diagrams, as-built drawings and three (3) sets of equipment operations and maintenance instructions for Owner.
 - e. All work and material for complete and operable systems as indicated or specified.
 - f. Permits, inspections and fees.
 - g. Identification and instruction to Owner Representative.
 - h. Coordination with Section 26 0533, RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS.
 - i. Furnishing of special back boxes where required for installation of devices.
10. Mechanical system duct detectors shall interface with fire alarm system without additional or special control devices.
11. All conductors to be installed in conduit pursuant to Specification Section 26 0533, RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS.
12. Qualifications: Contractor shall receive written approval and verified test results which shall be submitted to the Owner for system from manufacturers recognized representative prior to completion and acceptance.
13. All initiating devices shall be separately addressed for individual identification at control panel.
14. As-Built Drawings: A complete set of reproducible "as-built" drawings showing installed wiring, color coding, wire tag notations exact locations of all installed equipment, specific interconnections between all equipment and internal wiring of the equipment shall be delivered to the owner upon completion of the system.
15. Maintenance Instructions: Three (3) submittals of maintenance instructions shall be provided and shall be complete, easy to read, understandable and shall provide the following information:
- a. Instructions for replacing any components of the system, including internal parts.
 - b. Instructions for periodic cleaning and adjustments of equipment with a schedule of these functions.
 - c. A complete list of all equipment and components with information as to the address and telephone number of both the manufacturer and local supplier of each item.
 - d. User operating instructions shall be prominently displayed on a separate sheet located next to the control unit in accordance with UL Standard 864. The contractor shall warrant all equipment and wiring free from inherent mechanical and electrical defects for two years from the date of final acceptance.

1.03 SUBMITTALS

- A. Comply with applicable provisions of Section 26 0500, 1.4, COMMON WORK RESULTS FOR ELECTRICAL.
- B. The submittal shall include certification from the manufacturer verifying that the distributor is an authorized agent, who is qualified and trained by the manufacturer in the proper installation, operation and service of the system.
- C. Shop Drawings:
 - 1. A complete list of all supplied equipment including model numbers with catalog data sheets on each component and CSFM number.
 - 2. Provide schematic layout, floor plan, drawings indicating location of all components and equipment, required size and location of conduit and outlets and type and quantity of system conductors. Include voltage drop calculations and battery calculations based on actual number of devices to be installed.
 - 3. Include wiring diagrams for overall system and components including control panels, annunciators, power supplies, initiating circuits, notification appliances, control devices and FATC. Address numbers shall be noted on all appliances.
 - 4. Include physical and electrical characteristics of equipment to indicate conformance with the Specifications.
 - 5. Describe system characteristics and function as well as device wiring diagrams.
 - 6. Voltage drop and battery calculations for each control panel and power supply and initiating circuits.
 - 7. System operational matrix.
- D. Manufacturer shall provide certification that the equipment supplied under this Section has been reviewed and certified by IBC to meet the current criteria for special seismic certification. Include seismic companion anchorage requirements from the testing and as approved by the manufacturer. The manufacturer shall provide an approved label on the equipment enclosure stating that the equipment has been awarded a certificate of compliance for special seismic certification.
- E. Data Sheets: Show California State Fire Marshal Listing, U.L. listing, equipment ratings, dimensions and finishes.
- F. Manufacturer's Certificate: Note whether the system meets or exceeds specified requirements.
- G. Operating and Maintenance Instruction Manual:
 - 1. Manual shall include the following tailored to this specific project:
 - a. Operational description.
 - b. Coded cabling plan.
 - c. Two wire circuit diagrams.
 - d. Wiring destination schedule.
 - e. Schematic component diagrams and PC board layouts.
 - f. Maintenance and alignment procedures.
 - g. Voltage drop and battery calculations.

1.04 COORDINATION

- A. Refer to the electrical and mechanical drawings and specifications to determine quantities and location of devices and required scope of work and coordinate work with mechanical and electrical installers. Provide function described under mechanical section Sequence of Control, for fire and/or emergency conditions. Submit proposed interconnection to elevator supplier. Submit conduit and pathing requirements to electrical installer. For self-contained door release, coordinate with door supplier.

1.05 SYSTEM DESCRIPTION

- A. General: System to be listed by Underwriters Laboratories and the California State Fire Marshal, designed to meet the functional requirements of NFPA 72A, 72B and 72D.

1.06 SYSTEM OPERATION

- A. Wiring, equipment and devices for alarm initiation, annunciation, and audible signaling to be continuously supervised for opens, shorts or grounds (trouble). Each alarm initiating device circuit to be provided with illuminated and audible annunciation of both trouble and alarm conditions. Non-illumination indicates a normal condition.
- B. Any alarm or trouble condition shall sound an audible signal at the panel and the remote annunciator. Signal shall be silenced by a momentary contact switch which shall transfer the signal to a visual indicator. Subsequent trouble conditions shall cause the signal to resound and in turn may be silenced. Upon restoration to normal, the trouble signal silencing indicator shall extinguish automatically.
- C. Activation of any automatic or manual alarm initiating device shall cause the following to occur (where applicable):
 - 1. Sound an audible alarm and illuminate the visual indicator for zone and type of alarm at the fire command center, the remote annunciator and fire alarm control panel.
 - 2. Sound, at building of origin, the audible alarm signal over the system audible device(s).
 - 3. Transmit signal to release the electromagnetic hold open devices on corridor doors.
 - 4. Transmit signal to close smoke dampers.
 - 5. Transmit alarm signal to energy management system for shutdown of building air handler.
 - 6. Transmit alarm signal to the central station office.
 - 7. Release exit door locks.
- D. System shall not incorporate a time delay for any of the alarm initiating devices. All alarms shall be considered confirmed alarms.
- E. Detection shall be addressable and reporting of fire conditions to be accomplished by the following basic methods:
 - 1. Manual stations.
 - 2. Smoke detectors.
 - 3. Heat detectors.
 - 4. Duct detectors.

- 5. Waterflow switches.
- 6. Beam detectors.
- F. Alarm system inputs to be further subdivided as follows, for a more defined indication of the location and nature of the fire or trouble condition:
 - 1. Manual station by device and location.
 - 2. Smoke/heat detector by device and location.
 - 3. Waterflow or pressure switch by device and location.
 - 4. Sprinkler valve position indication by device and location.
- G. Alarm condition shall override trouble indication. Trouble indication shall reappear after alarm reset.

1.07 LOADS OF EQUIPMENT AND COMPONENTS

- A. Follow IEEE Standard where applicable.
- B. Provide fuse protection for equipment and spare fuses.
- C. Design systems for operation at 120 volts, normal or emergency power as indicated, 60 Hz nominal input.
- D. Operating voltage dissipated by resistors shall not exceed 25% of ratings.
- E. Operating voltage of capacitors shall not exceed 80% of rated voltage.
- F. Operating loads and voltages on transistors and solid-state devices shall not exceed manufacturer's recommendation for normal full load operation.
- G. Use electronic components of types and rating commonly available from stock of established commercial distribution.

1.08 GUARANTEE

- A. Conform to applicable provisions of the GENERAL REQUIREMENTS.
- B. Service technicians and replacement components for the system shall be available locally from a service representative of the manufacturer who is able to provide evidence of technical training and authorization by the manufacturer.
- C. For a period of two years from date of final acceptance, the system shall be under full guarantee for materials and labor at no cost to the District. The system shall be under a service contract with a technician authorized by the manufacturer. Replacement parts and labor shall be readily available during normal business hours while the service contract is in effect. A complete system inspection and test shall be performed at five months and again at eleven months after final acceptance. Tests shall include all smoke detector sensitivity settings.
- D. All component failures shall be remedied to the satisfaction of the Owner.

- E. A continuing service contract shall be offered at time of bid to commence at the expiration of warranty included with the system.

PART 2 - PRODUCT

2.01 MATERIALS

- A. Alarm Panel and system shall be UL listed for power-limited application, (as described on the plans). System shall be as manufactured by Fire-Lite or approved alternate.

PART 3 - EXECUTION

3.01 GENERAL

- A. Comply with all applicable paragraphs in Section 26 05 00, COMMON WORK RESULTS FOR ELECTRICAL, apply as though repeated herein.
- B. Install system(s) in accordance with manufacturer's instructions.
- C. Include services of certified technicians to supervise installation, provide adjustments, provide final connections, system testing and system training to Owner Representative.

3.02 GROUNDING

- A. All equipment to be grounded by means of green ground wire to "U" contact of duplex receptacles and bonded to ground provided under Section 26 0526, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.

3.03 INSPECTION

- A. Systems to meet all the requirements of the CSFM and IOR and AHJ and shall be approved thereby before installation and prior to final acceptance.

3.04 LOCATION

- A. Before installation, verify exact location of control equipment and outlets. The Owner reserves the right to relocate system components within a radius of 20' at no increase in cost before rough-in work is started for the respective component.

3.05 WIRING

- A. Furnish all conductors, equipment, terminal strips, etc., and labor to install a complete and operable system. All cable conductors shall be color coded and numbered for identification at

all terminals. Green shall be for grounding conductor only. Use red insulation and or red jacketing on all fire alarm cable.

3.06 TESTING

- A. After all equipment specified herein for each system has been installed and is in operating condition, conduct performance tests to determine if the installation and components comply with these specifications. Furnish competent personnel, all test material and approved test instruments and conduct the tests under supervision of factory personnel, in the presence of the Engineer, the building and fire inspecting agencies.
 - 1. The contractor's job foreman, in the presence of a representative of the manufacturer, a representative of the owner, and the fire department shall operate every installed device to verify proper operation and correct annunciation at the control panel.
 - 2. At least on half of all tests shall be performed on battery standby power.
 - 3. Where application of heat would destroy any detector, it may be manually activated.
 - 4. The signaling line circuits and notification appliance circuits shall be opened in at least two (2) locations to verify the presence of supervision.
 - 5. When the testing has been completed to the satisfaction of the Owner's representative a letter attesting to the satisfactory completion of said testing shall be forwarded to the owner and the authority having jurisdiction.
 - 6. The contractor shall leave the alarm system in proper working order, and, without additional expense to the Owner, shall replace any defective materials or equipment provided by him under this contract within two years from the date of final acceptance by the awarding authority.
 - 7. The local responding fire department must be notified prior to the final test in accordance with local requirements and when requested, participate in system testing and evaluation.

3.07 REPORT

- A. Prepare written report of final test results, signed by witnessing parties. Submit to the Engineer in triplicate for final approval.

END OF SECTION

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Section 31 1000
Site Clearing

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Clearing and protection of vegetation.
- B. Removal of existing debris.

1.02 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary: Limitations on Contractor's use of site and premises.
- B. Section 01 1000 - Summary: Sequencing and staging requirements.
- C. Section 01 5000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- D. Section 01 5713 - Temporary Erosion and Sediment Control.
- E. Section 01 7000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products.
- F. Section 01 7419 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.
- G. Section 02 4100 - Demolition: Removal of built elements and utilities.
- H. Section 31 2200 - Grading: Topsoil removal.
- I. Section 31 2200 - Grading: Fill material for filling holes, pits, and excavations generated as a result of removal operations.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Site Plan: Showing:
 - 1. Vegetation removal limits.
- C. Notice of Intent (NOI) and Stormwater Pollution Prevention Plan (SWPPP).
- D. Burn Permits shall be submitted to the Owner prior to burning of vegetation.
- E. Proof of legal disposal of all hazardous material shall be required when hazardous material is involved.

PART 2 PRODUCTS

2.01 MATERIALS

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

PART 3 EXECUTION

3.01 SITE CLEARING

- A. Comply with other requirements specified in Section 01 7000.
- B. Minimize production of dust due to clearing operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
- C. Clear and completely remove all fencing, trees, planting, and debris. Strip in accordance with Geotechnical Engineer's recommendations. Any existing irrigation lines shall be removed or crushed in place as directed by Geotechnical Engineer. The Contractor shall be responsible for determining the existing usage of these irrigation lines and shall obtain permission from the Owners of said lines, prior to any removal or crushing thereof. Any required to be relocated shall be brought to the attention of the Architect immediately, prior to proceeding.

3.02 EXISTING UTILITIES AND BUILT ELEMENTS

- A. Review the drawings and visit the site to determine all existing conditions, the nature of the structures, objects and materials to be encountered and all other facts concerning or affecting the scope of the work and intention of demolition. Information on the drawings showing existing conditions does not guarantee that other items may not be encountered. Remove all such items not shown on the drawings or specified to remain.
- B. Prior to bidding, Contractor shall perform any additional subsurface investigations necessary to completely familiarize and satisfy themselves as to the existing conditions in order to construct the facility
- C. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
- D. Protect existing utilities to remain from damage.
- E. Do not disrupt public utilities without permit from authority having jurisdiction.
- F. Protect existing structures and other elements that are not to be removed.

3.03 VEGETATION

- A. Vegetation Removed: Do not burn, bury, landfill, or leave on site, except as indicated.
 - 1. Chip, grind, crush, or shred vegetation for mulching, composting, or other purposes;

preference should be given to on-site uses.

2. Trees: Sell if marketable; if not, treat as specified for other vegetation removed; remove stumps and roots to depth of 36 inches, as specified in the Geotechnical Report, or as directed by the Geotechnical Engineer.
 3. Fill holes left by removal of stumps and roots, using suitable fill material, with top surface neat in appearance and smooth enough not to constitute a hazard to pedestrians.
- B. Restoration: If vegetation outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace at no cost to Owner.

3.04 DEBRIS

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

Section 31 2200
Grading

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Removal of topsoil.
- B. Rough grading the site for site structures.
- C. Finish grading.

1.02 RELATED REQUIREMENTS

- A. Document Geotechnical Report – Riverstone Fire Station XXXX
- B. Section 31 1000 - Site Clearing.
- C. Section 31 2316 - Excavation.
- D. Section 31 2323 - Fill: Filling and compaction.
- E. Section 31 2316.13 - Trenching: Trenching and backfilling for utilities.
- F. Section 32 9223 - Sodding: Finish ground cover.
- G. Section 32 9300 - Plants: Topsoil in beds and pits.

1.03 PRICE AND PAYMENT PROCEDURES

- A. See Section 01 2200 - Unit Prices, for general requirements relating to unit prices for this work.

1.04 SUBMITTALS

- A. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.
- B. Submit as-graded plan certifying the project was graded in conformance with the grading plan.
- C. Test Reports: Field Quality control tests to be supplied by Contractor.
- D. Certificate from Geotechnical Engineer for on-site work.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with County of Madera standards.
 - 1. Maintain one copy on site.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Other Fill Materials: See Section 31 2323.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that survey bench mark and intended elevations for the Work are as indicated.
- B. Verify the absence of standing or ponding water.
- C. Review Soils Reports for the site and conform all work to the recommendations.

3.02 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Stake and flag locations of known utilities.
- C. Locate, identify, and protect from damage above- and below-grade utilities to remain.
- D. Notify utility company to remove and relocate utilities.
- E. Provide temporary means and methods to remove all standing or ponding water from areas prior to grading.
- F. Protect site features to remain, including but not limited to bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs, from damage by grading equipment and vehicular traffic.
- G. Protect trees to remain by providing substantial fencing around entire tree at the outer tips of its branches; no grading is to be performed inside this line.
- H. Protect plants, lawns, rock outcroppings, and other features to remain as a portion of final landscaping.

3.03 ROUGH GRADING

- A. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.
- B. Do not remove topsoil when wet.
- C. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.
- D. Do not remove wet subsoil , unless it is subsequently processed to obtain optimum moisture content.

- E. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.
- F. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack surface water control.

3.04 SOIL REMOVAL

- A. Stockpile excavated subsoil on site. Stockpiles: Use areas designated on site; pile depth not to exceed 8 feet; protect from erosion.

3.05 FINISH GRADING

- A. Before Finish Grading:
 - 1. Verify building and trench backfilling have been inspected.
 - 2. Verify subgrade has been contoured and compacted.
- B. Remove debris, roots, branches, stones, in excess of 1/2 inch in size. Remove soil contaminated with petroleum products.
- C. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 3 inches.
- D. Place topsoil in areas indicated.
- E. Place topsoil to thickness as indicated.
- F. Place topsoil during dry weather.
- G. Remove roots, weeds, rocks, and foreign material while spreading.
- H. Near plants spread topsoil manually to prevent damage.
- I. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.
- J. Lightly compact placed topsoil.
- K. Maintain stability of topsoil during inclement weather. Replace topsoil in areas where surface water has eroded thickness below specifications.

3.06 TOLERANCES

- A. Top Surface of Subgrade: Plus or minus 0.10 foot (1-3/16 inches) from required elevation.
- B. Top Surface of Finish Grade: Plus or minus 0.04 foot (1/2 inch).

3.07 REPAIR AND RESTORATION

- A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition.

- B. Other Existing Vegetation to Remain: If damaged due to this work, replace with vegetation of equivalent species and size.

3.08 FIELD QUALITY CONTROL

- A. See Section 31 2323 for compaction density testing.

3.09 CLEANING

- A. Remove unused stockpiled topsoil and subsoil. Grade stockpile area to prevent standing water.
- B. Leave site clean and raked, ready to receive landscaping.

Section 31 2300
Temporary BMPs and Erosion Control

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Provide and implement Tempory BMP's.
- B. Prevention of erosion due to construction activities.
- C. Prevention of sedimentation of waterways, open drainage ways, and storm and sanitary sewers due to construction activities.
- D. Restoration of areas eroded due to insufficient preventive measures.
- E. Compensation of Owner for fines levied by authorities having jurisdiction due to non-compliance by Contractor.

1.02 RELATED REQUIREMENTS

- A. Section 31 1000 - Site Clearing: Limits on clearing; disposition of vegetative clearing debris.
- B. Section 31 2200 - Grading: Temporary and permanent grade changes for erosion control.
- C. Section 32 1123 - Aggregate Base Courses: Temporary and permanent roadways.

1.03 REFERENCE STANDARDS

- A. ASTM D4355 - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon Arc Type Apparatus; 2007.
- B. ASTM D4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity; 1999a (Reapproved 2009).
- C. ASTM D4533 - Standard Test Method for Trapezoid Tearing Strength of Geotextiles; 2011.
- D. ASTM D4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles; 2008.
- E. ASTM D4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile; 2012.
- F. ASTM D4873 - Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples; 2002 (Reapproved 2009).
- G. EPA (NPDES) - National Pollutant Discharge Elimination System (NPDES), Construction General Permit; current edition.

1.04 PERFORMANCE REQUIREMENTS

- A. Comply with all requirements of U.S. Environmental Protection Agency for erosion and sedimentation control, as specified for the National Pollutant Discharge Elimination System (NPDES), Phases I and II, under requirements for the 2009-009-DWQ Construction General Permit (CGP) and its amendments, whether the project is required by law to comply or not.
- B. Also comply with all more stringent requirements of State of California Erosion and Sedimentation Control Manual.
- C. Do not begin clearing, grading, or other work involving disturbance of ground surface cover until applicable permits have been obtained; furnish all documentation required to obtain applicable permits.
 - 1. Owner will obtain permits and pay for securities required by authority having jurisdiction.
 - 2. Owner will withhold payment to Contractor equivalent to all fines resulting from non-compliance with applicable regulations.
- D. Provide to Owner a Performance Bond covering erosion and sedimentation preventive measures only, in an amount equal to 100 percent of the cost of erosion and sedimentation control work.
- E. Timing: Put preventive measures in place as soon as possible after disturbance of surface cover and before precipitation occurs.
- F. Storm Water Runoff: Control increased storm water runoff due to disturbance of surface cover due to construction activities for this project.
 - 1. Prevent runoff into storm and sanitary sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less.
 - 2. Anticipate runoff volume due to the most extreme short term and 24-hour rainfall events that might occur in 25 years.
- G. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.
 - 1. Control movement of sediment and soil from temporary stockpiles of soil.
 - 2. Prevent development of ruts due to equipment and vehicular traffic.
 - 3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

- H. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.
 - 1. Prevent windblown soil from leaving the project site.
 - 2. Prevent tracking of mud onto public roads outside site.
 - 3. Prevent mud and sediment from flowing onto sidewalks and pavements.
 - 4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.
- I. Sedimentation of Waterways On Site: Prevent sedimentation of waterways on the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
 - 1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
 - 2. If sediment basins are used as temporary preventive measures, pump dry and remove deposited sediment after each storm.
- J. Sedimentation of Waterways Off Site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
 - 1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
- K. Open Water: Prevent standing water that could become stagnant.
- L. Maintenance: Maintain temporary preventive measures until permanent measures have been established.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Certificate: Mill certificate for silt fence fabric attesting that fabric and factory seams comply with specified requirements, signed by legally authorized official of manufacturer; indicate actual minimum average roll values; identify fabric by roll identification numbers.
- C. Ad Hoc reports shall be uploaded to SMARTS and hard copies provided to City.
- D. Approved NOT (Notice of Termination), shall be submitted to to SMARTS and a hard copy provided to owner.
- E. Stormwater Pollution Prevention Plan (unless this is prepared by Owner)

PART 2 PRODUCTS

2.01 MATERIALS

- A. Mulch: Use one of the following:
 - 1. Straw or hay.
 - 2. Wood waste, chips, or bark.
 - 3. Erosion control matting or netting.
- B. Silt Fence Fabric: Polypropylene geotextile resistant to common soil chemicals, mildew, and insects; non-biodegradable; in longest lengths possible; fabric including seams with the following minimum average roll lengths:
 - 1. Average Opening Size: 30 U.S. Std. Sieve, maximum, when tested in accordance with ASTM D4751.
 - 2. Permittivity: 0.05 sec^{-1} , minimum, when tested in accordance with ASTM D4491.
 - 3. Ultraviolet Resistance: Retaining at least 70 percent of tensile strength, when tested in accordance with ASTM D4355 after 500 hours exposure.
 - 4. Tensile Strength: 100 lb-f, minimum, in cross-machine direction; 124 lb-f, minimum, in machine direction; when tested in accordance with ASTM D4632.
 - 5. Elongation: 15 to 30 percent, when tested in accordance with ASTM D4632.
 - 6. Tear Strength: 55 lb-f, minimum, when tested in accordance with ASTM D4533.
 - 7. Color: Manufacturer's standard, with embedment and fastener lines preprinted.
- C. Silt Fence Posts: One of the following, minimum 5 feet long:
 - 1. Steel U- or T-section, with minimum mass of 1.33 lb per linear foot.
 - 2. Softwood, 4 by 4 inches in cross section.
 - 3. Hardwood, 2 by 2 inches in cross section.
- D. Fiber Rolls: 12" Diameter wheat, encased in jute netting, or an approved equal.
- E. Gravel: See Section 32 1123 for aggregate.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.

3.02 PREPARATION

- A. Schedule work so that soil surfaces are left exposed for the minimum amount of time.

3.03 SCOPE OF PREVENTIVE MEASURES

- A. In all cases, if permanent erosion resistant measures have been installed temporary preventive measures are not required.
- B. Construction Entrances: Traffic-bearing aggregate surface.
 - 1. Width: As required; 10 feet, minimum.
 - 2. Length: 25 feet, minimum.
 - 3. Provide at each construction entrance from public right-of-way.
 - 4. Where necessary to prevent tracking of mud onto right-of-way, provide wheel washing area out of direct traffic lane, with drain into sediment trap or basin.
- C. Linear Sediment Barriers: Made of silt fences or straw wattles.
 - 1. Provide linear sediment barriers:
 - a. Along downhill perimeter edge of disturbed areas, including soil stockpiles.
 - b. Along the toe of cut slopes and fill slopes.
 - c. Perpendicular to flow across the bottom of existing and new drainage channels and swales that traverse disturbed areas or carry runoff from disturbed areas; space at maximum of 200 feet apart.
- D. Storm Drain Curb Inlet Sediment Trap: Protect each curb inlet using one of the following measures:
 - 1. Gravel bags oriented to filter sediments from the direction of flows.
 - 2. Premanufactured sedimentation rolls/socks placed per the manufacturer's recommendations for storm drain inlet protection procedures.
- E. Soil Stockpiles: Protect using one of the following measures:
 - 1. Cover with polyethylene film, secured by placing soil on outer edges.
 - 2. Cover with mulch at least 4 inches thickness of pine needles, sawdust, bark, wood chips, or shredded leaves, or 6 inches of straw or hay.
- F. Mulching: Use only for areas that may be subjected to erosion for less than 6 months.
 - 1. Wood Waste: Use only on slopes 3:1 or flatter; no anchoring required.

- G. Temporary Seeding: Use where temporary vegetated cover is required.
- H. Good housekeeping procedures as required by the General Permit.
- I. Specified material delivery and storage area with adequate containment measures, as required in the General Permit.
- J. Concrete waste cleanout measures as required by the General Permit.
- K. Maintenance of Best Management Practices as required by the General Permit.

3.04 INSTALLATION

A. Traffic-Bearing Aggregate Surface:

- 1. Excavate minimum of 6 inches.
- 2. Place geotextile fabric full width and length, with minimum 12 inch overlap at joints.
- 3. Place and compact at least 6 inches of 1.5 to 3.5 inch diameter stone.

B. Silt Fences:

- 1. Store and handle fabric in accordance with ASTM D4873.
- 2. Where slope gradient is less than 3:1 or barriers will be in place less than 6 months, use nominal 16 inch high barriers with minimum 36 inch long posts spaced at 6 feet maximum, with fabric embedded at least 4 inches in ground.
- 3. Where slope gradient is steeper than 3:1 or barriers will be in place over 6 months, use nominal 28 inch high barriers, minimum 48 inch long posts spaced at 6 feet maximum, with fabric embedded at least 6 inches in ground.
- 4. Where slope gradient is steeper than 3:1 and vertical height of slope between barriers is more than 20 feet, use nominal 32 inch high barriers with woven wire reinforcement and steel posts spaced at 4 feet maximum, with fabric embedded at least 6 inches in ground.
- 5. Install with top of fabric at nominal height and embedment as specified.
- 6. Do not splice fabric width; minimize splices in fabric length; splice at post only, overlapping at least 18 inches, with extra post.
- 7. Fasten fabric to wood posts using one of the following:
 - a. Four 3/4 inch diameter, 1 inch long, 14 gage nails.
 - b. Five 17-gage staples with 3/4 inch wide crown and 1/2 inch legs.
- 8. Fasten fabric to steel posts using wire, nylon cord, or integral pockets.

9. Wherever runoff will flow around end of barrier or over the top, provide temporary splash pad or other outlet protection; at such outlets in the run of the barrier, make barrier not more than 12 inches high with post spacing not more than 4 feet.

C. Mulching Over Small and Medium Areas:

1. Dry Straw and Hay: Apply 4 to 6 inches depth.
2. Wood Waste: Apply 2 to 3 inches depth.
3. Erosion Control Matting: Comply with manufacturer's instructions.

3.05 MAINTENANCE

- A. Ensure that all inspection, maintenance, repair, and sampling activities, at the project location shall be performed or supervised by a Qualified SWPPP Practitioner (QSP).
- B. Perform weekly inspections and observations, and at least once each 24-hour period during extended storm events, to identify and record BMPs that need maintenance to operate effectively, that have failed, or that could fail to operate as intended.
- C. For each inspection required, dischargers shall complete an inspection checklist using a form provided by the State Water Board or Regional Water Board.
- D. Checklists shall remain onsite with the SWPPP and at a minimum shall include:
 1. Inspection date and date the inspection report was written.
 2. Weather information, including presence or absence of precipitation, estimate of beginning of qualifying storm event, duration of event, time elapsed since last storm, and approximate amount of rainfall in inches.
 3. Site information, including stage of construction, activities completed, and approximate area of the site exposed.
 4. A description of BMPs evaluated and any deficiencies noted.
 5. Any corrective action required, including any necessary changes to the SWPPP and the associated implementation date.
 6. Photographs taken during the inspection, if any.
 7. Inspector's name, title and signature.
- E. Repair deficiencies immediately.
- F. Silt Fences:
 1. Promptly replace fabric that deteriorates unless need for fence has passed.

2. Remove silt deposits that exceed one-third of the height of the fence.
 3. Repair fences that are undercut by runoff or otherwise damaged, whether by runoff or other causes.
- G. Clean out temporary sediment control structures weekly and relocate soil on site.
- H. Place sediment in appropriate locations on site; do not remove from site.

3.06 CLEAN UP

- A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Architect
- B. Clean out temporary sediment control structures that are to remain as permanent measures.
- C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

END OF SECTION

Section 31 2316
Excavation

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Excavating for building volume below grade, footings, pile caps, slabs-on-grade, paving, site structures, and utilities within the building.
- B. Trenching for utilities outside the building to utility main connections.

1.02 RELATED REQUIREMENTS

- A. Document Geotechnical Report – Riverstone Fire Station XXXX
- B. Section 01 5713 - Temporary Erosion and Sediment Control: Slope protection and erosion control.
- C. Section 31 2200 - Grading: Grading.
- D. Section 31 2323 - Fill: Fill materials, backfilling, and compacting.
- E. Section 31 2316.13 - Trenching: Excavating for utility trenches outside the building to utility main connections.

PART 3 EXECUTION

2.01 EXAMINATION

- A. Verify that survey bench mark and intended elevations for the work are as indicated.
- B. Review Soils Report for the site and conform all work to the recommendations.

2.02 PREPARATION

- A. Identify required lines, levels, contours, and datum locations.
- B. See Section 31 2200 for topsoil removal.
- C. Locate, identify, and protect utilities that remain and protect from damage.
- D. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- E. Grade top perimeter of excavation to prevent surface water from draining into excavation. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by Architect.

2.03 EXCAVATING

- A. Excavate to accommodate new structures and construction operations.
- B. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- C. Do not interfere with 45 degree bearing splay of foundations.
- D. Provide temporary means and methods, as required, to remove all water from excavations until directed by Architect. Remove and replace soils deemed suitable by classification and which are excessively moist due to lack of dewatering or surface water control.

2.04 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.
- B. Provide for visual inspection of load-bearing excavated surfaces by Architect before placement of foundations.

2.05 PROTECTION

- A. Divert surface flow from rains or water discharges from the excavation.
- B. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.
- C. Protect open excavations from rainfall, runoff, freezing groundwater, or excessive drying so as to maintain foundation subgrade in satisfactory, undisturbed condition.
- D. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.
- E. Keep excavations free of standing water and completely free of water during concrete placement.

END OF SECTION

Section 31 2316.13
Trenching

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Backfilling and compacting for utilities outside the building to utility main connections.

1.02 RELATED REQUIREMENTS

- A. Document Geotechnical Report – Riverstone Fire Station XXXX
- B. Section 31 2200 - Grading: Site grading.
- C. Section 31 2316 - Excavation: Building and foundation excavating.
- D. Section 31 2323 - Fill: Backfilling at building and foundations.
- E. Root Creek Water District Standard Specifications
- F. County of Madera Standard Plans and Specific

1.03 PRICE AND PAYMENT PROCEDURES

- A. See Section 01 2200 - Unit Prices, for general requirements applicable to unit prices for earthwork.

1.04 REFERENCE STANDARDS

- A. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18 in.) Drop 2021, with Errata (2022).
- B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)) 2012 (Reapproved 2021).
- C. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method 2015, with Editorial Revision (2016).
- D. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)) 2012 (Reapproved 2021).
- E. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method 2015.
- F. ASTM D 2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth); 2005.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Materials Sources: Submit name of imported materials source.
- C. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used.
- D. Compaction Density Test Reports.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. When necessary, store materials on site in advance of need.

PART 2 PRODUCTS

2.01 FILL MATERIALS

2.02 SOURCE QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for testing and analysis of soil material.
- B. Where fill materials are specified by reference to a specific standard, test and analyze samples for compliance before delivery to site.
- C. If tests indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that survey bench marks and intended elevations for the work are as indicated.
- B. Review Soils Report for the site and conform work to recommendations provided.
- C. All work within this section involving Root Creek Water District (RCWD) infrastructure shall be performed in accordance with the RCWD Standard Specifications.

3.02 PREPARATION

- A. Identify required lines, levels, contours, and datum locations.
- B. Locate, identify, and protect utilities that remain and protect from damage.
- C. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- D. Grade top perimeter of trenching area to prevent surface water from draining into trench. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by the Architect.

3.03 TRENCHING

- A. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- B. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.
- C. Do not interfere with 45 degree bearing splay of foundations.
- D. Cut trenches wide enough to allow inspection of installed utilities.
- E. Hand trim excavations. Remove loose matter.
- F. Remove excavated material that is unsuitable for re-use from site.
- G. Remove excess excavated material from site.
- H. Provide temporary means and methods, as required, to remove all water from trenching until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.
- I. Determine the prevailing groundwater level prior to trenching. If the proposed trench extends less than 1 foot into the prevailing groundwater, control groundwater intrusion with perimeter drains routed to sump pumps, or as directed by the Architect.

3.04 PREPARATION FOR UTILITY PLACEMENT

- A. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.
- B. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- C. Until ready to backfill, maintain excavations and prevent loose soil from falling into excavation.

3.05 BACKFILLING

- A. Fill up to subgrade elevations unless otherwise indicated.
- B. Employ a placement method that does not disturb or damage other work.
- C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- D. Maintain optimum moisture content of fill materials to attain required compaction density.
- E. Granular Fill: Place and compact materials in equal continuous layers not exceeding 6 inches compacted depth.
- F. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.

- G. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
- H. Correct areas that are over-excavated.
 - 1. Other areas: Use general fill, flush to required elevation, compacted to minimum 97 percent of maximum dry density.
- I. Compaction Density Unless Otherwise Specified or Indicated:
 - 1. Under paving, slabs-on-grade, and similar construction: 95 percent of maximum dry density.
 - 2. At other locations: 90 percent of maximum dry density.
- J. Reshape and re-compact fills subjected to vehicular traffic.

3.06 TOLERANCES

- A. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

3.07 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.
- B. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, ASTM D2922, or ASTM D3017.
- C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D1557 ("modified Proctor"), AASHTO T 180, or ASTM D698 ("standard Proctor").
- D. If tests indicate work does not meet specified requirements, remove work, replace and retest.
- E. Frequency of Tests: As required by City.

3.08 CLEANING

- A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

End of Section

Section 31 2323
Fill

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- A. Document Geotechnical Report – Riverstone Fire Station XXXX
- B. Section 01 5713 - Temporary Erosion and Sediment Control: Slope protection and erosion control.
- C. Section 31 2200 - Grading: Site grading.
- D. Section 31 2316 - Excavation: Removal and handling of soil to be re-used.
- E. Section 31 2316.13 - Trenching: Excavating for utility trenches outside the building to utility main connections.
- F. Section 32 1423 - Asphalt Unit Paving: Leveling bed placement under pavers.

1.02 PRICE AND PAYMENT PROCEDURES

- A. See Section 01 2200 - Unit Prices, for general requirements applicable to unit prices for earthwork.

1.03 REFERENCE STANDARDS

- A. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18 in.) Drop 2021, with Errata (2022).
- B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)) 2012 (Reapproved 2021).
- C. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method 2015, with Editorial Revision (2016).
- D. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)) 2012 (Reapproved 2021).
- E. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method 2015.
- F. ASTM D 2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth); 2005.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Materials Sources: Submit name of imported materials source.

- C. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used, including manufactured fill.
- D. Compaction Density Test Reports.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. When necessary, store materials on site in advance of need.

PART 2 PRODUCTS

2.01 FILL MATERIALS

- A. General Fill: Subsoil excavated on-site.
 - 1. Graded.
 - 2. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.
 - 3. Conforming to Geotechnical Report.
- B. Structural Fill: Subsoil excavated on-site.
 - 1. Graded.
 - 2. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.
 - 3. Conforming to Geotechnical Report.
- C. Granular Fill- Gravel - Class II. Angular crushed washed stone; free of shale, clay, friable material and debris.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Identify required lines, levels, contours, and datum locations.
- B. See Section 31 2200 for additional requirements.
- C. Verify areas to be filled are not compromised with surface or ground water.
- D. Review Soils Report for the site and conform all work to the recommendations.

3.02 PREPARATION

- A. Scarify and proof roll subgrade surface to a depth of 6 inches to identify soft spots.
- B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.
- C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

- D. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

3.03 FILLING

- A. Fill to contours and elevations indicated using unfrozen materials.
- B. Employ a placement method that does not disturb or damage other work.
- C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- D. Maintain optimum moisture content of fill materials to attain required compaction density.
- E. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
- F. Correct areas that are over-excavated.
 - 1. Other areas: Use general fill, flush to required elevation, compacted to minimum 97 percent of maximum dry density.
- G. Compaction Density Unless Otherwise Specified or Indicated:
 - 1. Under paving, slabs-on-grade, and similar construction: 95 percent of maximum dry density.
 - 2. At other locations: 90 percent of maximum dry density.
- H. Reshape and re-compact fills subjected to vehicular traffic.
- I. Maintain temporary means and methods, as required, to remove all water while fill is being placed as required, or until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

3.04 FILL AT SPECIFIC LOCATIONS

- A. Use general fill unless otherwise specified or indicated.
- B. Structural Fill at building pad:
 - 1. Maximum depth per lift: 8 inches, compacted.
 - 2. Compact to minimum 95 percent of maximum dry density.

3.05 TOLERANCES

- A. Top Surface of General Filling: Plus or minus 1 inch from required elevations.

3.06 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.
- B. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, ASTM D2922, or ASTM D3017.
- C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with AASHTO T 180, ASTM D1557 ("modified Proctor"), ASTM D698 ("standard Proctor"), AASHTO T 180, ASTM D1557 ("modified Proctor"), ASTM D698 ("standard Proctor"), AASHTO T 180, ASTM D1557 ("modified Proctor"), or ASTM D698 ("standard Proctor").
- D. If tests indicate work does not meet specified requirements, remove work, replace and retest.
- E. Frequency of Tests: Per Geotechnical Engineer.

3.07 CLEANING

- A. See Section 01 7419 - Construction Waste Management and Disposal, for additional requirements.
- B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION

Section 32 1123
Aggregate Base Courses

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aggregate base course.
- B. Paving aggregates.

1.02 RELATED REQUIREMENTS

- A. Section 31 2200 - Grading: Preparation of site for base course.
- B. Section 31 2323 - Fill: Compacted fill under base course.
- C. Section 31 2316.13 - Trenching: Compacted fill over utility trenches under base course.
- D. Section 33 0513 - Manholes and Structures: Manholes including frames.
- E. Section 32 1216 - Asphalt Paving: Finish and binder asphalt courses.
- F. Section 32 1313 - Concrete Paving: Finish concrete surface course.

1.03 PRICE AND PAYMENT PROCEDURES

- A. See Section 01 2200 - Unit Prices for general requirements applicable to unit prices for earthwork.

1.04 REFERENCE STANDARDS

- A. AASHTO M 147 - Standard Specification for Materials for Aggregate and Soil-Aggregate Subbase, Base, and Surface Courses 2017 (Reapproved 2021).
- B. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18 in.) Drop 2021, with Errata (2022).
- C. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates 2019.
- D. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)) 2012 (Reapproved 2021).
- E. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method 2015, with Editorial Revision (2016).
- F. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)) 2012 (Reapproved 2021).

- G. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method 2015.
- H. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System) 2017, with Editorial Revision (2020).
- I. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils 2017, with Editorial Revision (2018).
- J. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth) 2017a, with Editorial Revision (2021).

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Aggregate Composition Test Reports: Results of laboratory tests on proposed and actual materials used.
- C. Compaction Density Test Reports.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. When necessary, store materials on site in advance of need.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Coarse Aggregate Type II: Coarse aggregate, conforming to State of California Highway Department standard.
- B. Coarse Aggregate 3/4" : Natural washed stone; free of shale, clay, friable material and debris.
 - 1. Graded in accordance with ASTM C136/C136M, within the following limits:
 - a. 2 inch sieve: 100 percent passing.
 - b. 1 inch sieve: 100 percent passing.
 - c. 3/4 inch sieve: 90 to 100 percent passing.
 - d. No. 4 sieve: 35 to 60 percent passing.
 - e. 30 sieve: 10 to 30 percent passing.
 - f. No. 200: 2 to 9 percent passing.

2.02 SOURCE QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements for general requirements for testing and analysis of aggregate materials.
- B. Where aggregate materials are specified using ASTM D2487 classification, test and analyze samples for compliance before delivery to site.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that survey bench marks and intended elevations for the work are as indicated.
- B. Verify substrate has been inspected, gradients and elevations are correct, and is dry.

3.02 PREPARATION

- A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.
- B. Do not place aggregate on soft, muddy, or frozen surfaces.

3.03 INSTALLATION

- A. Under Bituminous Concrete Paving:
 - 1. Compact to 95 percent of maximum dry density.
- B. Under Portland Cement Concrete Paving:
 - 1. Place coarse aggregate to a total compacted thickness of 6 inches.
 - 2. Compact to 95 percent of maximum dry density.
- C. Place aggregate in maximum 6" layers and roller compact to specified density.
- D. Level and contour surfaces to elevations and gradients indicated.
- E. Add small quantities of fine aggregate to coarse aggregate as appropriate to assist compaction.
- F. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.
- G. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.04 TOLERANCES

- A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.
- B. Scheduled Compacted Thickness: Within 1/4 inch.

- C. Variation From Design Elevation: Within 1/2 inch.

3.05 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements for general requirements for field inspection and testing.
- B. Compaction density testing will be performed on compacted aggregate base course in accordance with ASTM D1556, ASTM D2167, or ASTM D6938.
- C. Results will be evaluated in relation to compaction curve determined by testing uncompacted material in accordance with AASHTO T 180, ASTM D698 ("standard Proctor"), or ASTM D1557 ("modified Proctor").
- D. If tests indicate work does not meet specified requirements, remove work, replace and retest.
- E. Proof roll compacted aggregate at surfaces that will be under slabs-on-grade.

3.06 CLEANING

- A. Leave unused materials in a neat, compact stockpile.

End of Section

Section 32 1216
Asphalt Paving

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Single course bituminous concrete paving.
- B. Double course bituminous concrete paving.
- C. Surface sealer.

1.02 RELATED REQUIREMENTS

- A. Section 31 2200 - Grading: Preparation of site for paving and base.
- B. Section 31 2323 - Fill: Compacted subgrade for paving.
- C. Section 33 0513 - Manholes and Structures: Manholes, including frames; gutter drainage grilles, covers, and frames for placement by this section.
- D. Section 32 1123 - Aggregate Base Courses: Aggregate base course.

1.03 PRICE AND PAYMENT PROCEDURES

- A. See Section 01 2200 - Unit Prices for requirements applicable to this section. Measurement and payment will be as follows:
- B. Seal Coat: By the square yard. Includes preparing surfaces and applying.

1.04 REFERENCE STANDARDS

- A. County of Madera Standard Plans and Specifications.
- B. AI MS-19 - Basic Asphalt Emulsion Manual 2008.
- C. ASTM D946 - Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction 2009a.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with County of Madera Standards.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Asphalt Cement: ASTM D946.

B. Type A Hot Mix Asphalt (HMA) Aggregate shall be 3/4 Inch Maximum, Coarse/

C. Aggregate Base shall be Class 2 per Section 1123.

2.02 ASPHALT PAVING MIXES AND MIX DESIGN

A. Submit proposed mix design of each class of mix for review prior to beginning of work.

2.03 SOURCE QUALITY CONTROL

A. Test mix design and samples in accordance with AI MS-2.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that compacted subgrade is dry and ready to support paving and imposed loads.

B. Verify gradients and elevations of base are correct.

3.02 AGGREGATE BASE COURSE

A. See Section 32 1123.

3.03 PREPARATION PRIMER

A. Apply primer in accordance with manufacturer's instructions.

B. Apply primer on aggregate base or subbase at uniform rate of 1/3 gal/sq yd.

C. Use clean sand to blot excess primer.

3.04 PREPARATION TAC COAT

A. Apply tack coat in accordance with manufacturer's instructions.

B. Apply tack coat on asphalt or concrete surfaces over subgrade surface at uniform rate of 1/3 gal/sq yd.

C. Apply tack coat to contact surfaces of curbs, gutters and .

D. Coat surfaces of manhole frames with oil to prevent bond with asphalt pavement. Do not tack coat these surfaces.

3.05 PLACING ASPHALT PAVEMENT DOUBLE COURSE

A. Place asphalt binder course within 24 hours of applying primer or tack coat.

B. Place asphalt wearing course within two hours of placing and compacting binder course.

C. Install gutter drainage grilles and frames in correct position and elevation.

- D. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.
- E. Perform rolling with consecutive passes to achieve even and smooth finish, without roller marks.

3.06 SEAL COAT

- A. Apply seal coat to surface course and asphalt curbs in accordance with AI MS-19.

3.07 TOLERANCES

- A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.
- B. Variation from True Elevation: Within 1/2 inch.

3.0 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for quality control.
- B. Provide field inspection and testing. Take samples and perform tests in accordance with AI MS-2.

3.0 PROTECTION

- A. Immediately after placement, protect pavement from mechanical injury for 2 days or until surface temperature is less than 140 degrees F.

END OF SECTION

Section 32 1313
Concrete Paving

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concrete sidewalks, stair steps, integral curbs, gutters, median barriers, parking areas, and roads.

1.02 RELATED REQUIREMENTS

- A. Section 03 1000 - Concrete Forming and Accessories.
- B. Section 03 3000 - Cast-in-Place Concrete.
- C. Section 31 2200 - Grading: Preparation of site for paving and base and preparation of subsoil at pavement perimeter for planting.
- D. Section 31 2323 - Fill: Compacted subbase for paving.
- E. Section 33 0513 - Manholes and Structures: Manholes, including frames; gutter drainage grilles, covers, and frames for placement by this section.
- F. Section 32 1123 - Aggregate Base Courses
- G. Section 32 1216 - Asphalt Paving
- H. Section 32 1726 - Tactile Warning Surfacing: Plastic tactile and detectable warning tiles for pedestrian walking surfaces.
- I. Section 03 3000 - Cast-in-Place Concrete.
- J. Section 09 9000 - Painting and Coating: Pavement markings.

1.03 PRICE AND PAYMENT PROCEDURES

- A. Provide concrete paving by the unit price method.
- B. See Section 01 2200 - Unit Prices, for additional unit price requirements.

1.04 REFERENCE STANDARDS

- A. County of Madera Standard Plans and Specifications.
- B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete 1991 (Reapproved 2009).
- C. ACI 301 - Specifications for Concrete Construction 2020.
- D. ACI 305R - Guide to Hot Weather Concreting 2020.

- E. ACI 306R - Guide to Cold Weather Concreting 2016.
- F. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2022.
- G. ASTM C33/C33M - Standard Specification for Concrete Aggregates 2018.
- H. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens 2021.
- I. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete 2022a.
- J. ASTM C150/C150M - Standard Specification for Portland Cement 2022.
- K. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types) 2018.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on joint filler, admixtures, and curing compound.
- C. Design Data: Indicate pavement thickness, designed concrete strength, reinforcement, and typical details.

PART 2 PRODUCTS

2.01 PAVING ASSEMBLIES

- A. Comply with applicable requirements of ACI 301.
- B. Concrete pavement at vehicular paving and pedestrian paving as identified on plans.

2.02 FORM MATERIALS

- A. Form Materials: As specified in Section 03 1000, comply with ACI 301.

2.03 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) yield strength; deformed billet steel bars; unfinished unless otherwise specified on plans.
- B. Dowels: ASTM A615/A615M, Grade 40 - 40,000 psi yield strength; deformed billet steel bars; unfinished finish unless otherwise specified on plans.

2.04 CONCRETE MATERIALS

- A. Obtain cementitious materials from same source throughout.

- B. Concrete Materials: As specified in Section 03 3000.

2.05 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Concrete Properties:
 - 1. Compressive strength as specified on plans.
 - 2. Water-Cement Ratio: Maximum 50 percent by weight.
 - 3. Maximum Slump: 3 inches.

2.06 MIXING

- A. Transit Mixers: Comply with ASTM C94/C94M.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.

3.02 SUBBASE

- A. See Section 32 1123 for construction of base course for work of this Section.

3.03 FORMING

- A. Place and secure forms to correct location, dimension, profile, and gradient.

3.04 REINFORCEMENT

- A. Place reinforcement as indicated.
- B. Interrupt reinforcement at expansion joints.

3.05 COLD AND HOT WEATHER CONCRETING

- A. Follow recommendations of ACI 305R when concreting during hot weather.
- B. Follow recommendations of ACI 306R when concreting during cold weather.
- C. Do not place concrete when base surface temperature is less than 40 degrees F, or surface is wet or frozen.

3.06 PLACING CONCRETE

- A. Place concrete in accordance with State of California Highways standards.

- B. Ensure reinforcement, inserts, embedded parts, formed joints are not disturbed during concrete placement.

3.07 JOINTS

- A. Align curb, gutter, and sidewalk joints.
- B. Place 3/8 inch wide expansion joints at 20 foot intervals and to separate paving from vertical surfaces and other components and in pattern indicated unless otherwise specified on plans.
- C. Provide scored joints.
 - 1. At 5 feet intervals unless otherwise specified on plans.
 - 2. Between sidewalks and curbs.
 - 3. Between curbs and pavement.

3.0 FINISHING

- A. Area Paving: Light broom, texture perpendicular to pavement direction.
- B. Sidewalk Paving: Light broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius.
- C. Curbs and Gutters: Light broom, texture parallel to pavement direction.
- D. Place curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

3.0 TOLERANCES

- A. Maximum Variation of Surface Flatness: 1/4 inch in 10 ft.
- B. Maximum Variation From True Position: 1/4 inch.

3.10 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.
 - 1. Provide free access to concrete operations at project site and cooperate with appointed firm.
- B. Compressive Strength Tests: ASTM C39/C39M; for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cu yd or less of each class of concrete placed.
 - 1. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
 - 2. Perform one slump test for each set of test cylinders taken.

- C. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

3.11 PROTECTION

- A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.
- B. Do not permit pedestrian traffic over pavement for 7 days minimum after finishing.

END OF SECTION

Section 32 1723.13
Painted Pavement Markings

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Parking lot markings, including parking bays, crosswalks, arrows, handicapped symbols, and curb markings.

1.02 RELATED REQUIREMENTS

- A. Section 32 1216 - Asphalt Paving.
- B. Section 32 1313 - Concrete Paving.

1.03 PRICE AND PAYMENT PROCEDURES

- A. See Section 01 2100 - Allowances, for cash allowances affecting this section.

1.04 REFERENCE STANDARDS

- A. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association Current Edition.
- B. FHWA MUTCD - Manual on Uniform Traffic Control Devices 2010, with Errata.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver paint in containers of at least 5 gallons accompanied by batch certificate.
- B. Store products in manufacturer's unopened packaging until ready for installation.
- C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Line and Zone Marking Paint: MPI (APL) No. 97 Latex Traffic Marking Paint; color(s) as indicated.
 - 1. Handicapped Symbols: Blue.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Allow new pavement surfaces to cure for a period of not less than 14 days before application of marking materials.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Clean surfaces thoroughly prior to installation.
 - 1. Remove dust, dirt, and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water, or a combination of these methods.
- D. Where oil or grease are present, scrub affected areas with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinse thoroughly after each application; after cleaning, seal oil-soaked areas with cut shellac to prevent bleeding through the new paint.
- E. Establish survey control points to determine locations and dimensions of markings; provide templates to control paint application by type and color at necessary intervals.

3.03 INSTALLATION

- A. Begin pavement marking as soon as practicable after surface has been cleaned and dried.
- B. Do not apply paint if temperature of surface to be painted or the atmosphere is less than 50 degrees F or more than 95 degrees F.
- C. Apply in accordance with manufacturer's instructions using an experienced technician that is thoroughly familiar with equipment, materials, and marking layouts.
- D. Comply with FHWA MUTCD manual (<http://mutcd.fhwa.dot.gov>) for details not shown.

- E. Apply markings in locations determined by measurement from survey control points; preserve control points until after markings have been accepted.
- F. Apply uniformly painted markings of color(s), lengths, and widths as indicated on drawings true, sharp edges and ends.
 - 1. Apply paint in one coat only.
 - 2. Wet Film Thickness: 0.015 inch, minimum.
 - 3. Width Tolerance: Plus or minus 1/8 inch.
- G. Parking Lots: Apply parking space lines, entrance and exit arrows, painted curbs, and other markings indicated on drawings.
 - 1. Mark the International Handicapped Symbol at indicated parking spaces.
 - 2. Hand application by pneumatic spray is acceptable.
- H. Symbols: Use a suitable template that will provide a pavement marking with true, sharp edges and ends, of the design and size indicated.

END OF SECTION

Section 32 1726
Tactile Warning Surfacing

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- A. Section 32 1313 - Concrete Paving: Concrete sidewalks.
- B. Section 32 1723.13 - Painted Pavement Markings: Crosswalk and curb markings.

1.02 REFERENCE STANDARDS

- A. 49 CFR 37 - Transportation Services for Individuals with Disabilities (ADA) current edition.
- B. AASHTO LRFD - Bridge Design Specifications 2020.
- C. ADA Standards - 2010 ADA Standards for Accessible Design 2010.
- D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- E. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus 2019.
- F. ASTM C501 - Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser 2021.
- G. ASTM C903 - Standard Practice for Preparing Refractory Specimens by Cold Gunning 2015 (Reapproved 2020).
- H. ASTM D2047 - Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine 2017.
- I. ASTM D543 - Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents 2021.
- J. ASTM D570 - Standard Test Method for Water Absorption of Plastics 1998 (Reapproved 2018).
- K. ASTM D638 - Standard Test Method for Tensile Properties of Plastics 2022.
- L. ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics 2015.
- M. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials 2017.
- N. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.

- O. ASTM G155 - Standard Practice for Operating Xenon Arc Lamp Apparatus for Exposure of Materials 2021.
- P. ATBCB PROWAG - Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way 2011.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturer's product data, standard details, details specific to this project; written installation and maintenance instructions.
- C. Warranty: Submit manufacturer warranty; complete forms in Owner's name and register with manufacturer.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Company certified in writing by product manufacturer as having successfully completed work substantially similar to the work of this section.

1.05 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Plastic Tiles: Provide manufacturer's standard five year warranty against manufacturing defects, breakage or deformation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Plastic Tactile and Detectable Warning Surface Tiles:
 - 1. Access Tile, a brand of Access Products, Inc; [____]: www.accessproducts.com/#sle.
 - 2. Armor-Tile, a brand of Engineered Plastics, Inc; [____]: www.armortiletransit.com/#sle.

2.02 TACTILE AND DETECTABLE WARNING DEVICES

- A. Plastic Tactile and Detectable Warning Tiles: ADA Standards compliant, glass fiber and carbon fiber reinforced, exterior grade, matte finish polyester sheet with truncated dome pattern, solid color throughout, internal reinforcing of sheet and of truncated domes, integral radius cut lines on back face of tile; with factory-applied removable protective sheeting.
 - 1. Material Properties:
 - a. Water Absorption: 0.20 percent, maximum, when tested in accordance with ASTM D570.

- b. Slip Resistance: 0.50 minimum dry static coefficient of friction, when tested in accordance with ASTM D2047.
 - c. Compressive Strength: 25,000 pounds per square inch, minimum, when tested in accordance with ASTM D695.
 - d. Tensile Strength: 10,000 pounds per square inch, minimum, when tested in accordance with ASTM D638.
 - e. Flexural Strength: 25,000 pounds per square inch minimum, when tested in accordance with ASTM D790.
 - f. Chemical Stain Resistance: No reaction to 1 percent hydrochloric acid, motor oil, calcium chloride, gum, soap solution, bleach, or antifreeze, when tested in accordance with ASTM D543.
 - g. Abrasion Resistance: 300, minimum, when tested in accordance with ASTM C501.
 - h. Flame Spread Index: 25, maximum, when tested in accordance with ASTM E84.
 - i. Accelerated Weathering: Delta-E of less than 5.0 at 2,000 hours exposure, when tested in accordance with ASTM G155.
 - j. Adhesion: No delamination of tile prior to board failure in a temperature range of 20 to 180 degrees F, when tested in accordance with ASTM C903.
 - k. Loading: No damage when tested according to AASHTO LRFD test method HS20.
 - l. Salt and Spray Performance: No deterioration or other defect after 200 hours of exposure, when tested in accordance with ASTM B117.
2. Pattern: In-line pattern of truncated domes complying with ADA Standards.

2.03 ACCESSORIES

- A. Fasteners: ASTM A666, Type 304 stainless steel
 - 1. Type: Countersunk, color matched composite sleeve anchors
 - 2. Size: 1/4 inch diameter and 1-1/2 inches long.
- B. Adhesive: Type recommended and approved by surfacing tile manufacturer.
- C. Sealant: Elastomeric sealant of color to match adjacent surfaces; approved by surfacing tile manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. When installation location is near site boundary or property line, verify required location using property survey.
- B. Verify that work area is ready to receive work:
 - 1. If existing conditions are not as required to properly complete the work of this section, notify Architect.
 - 2. Do not proceed with installation until deficiencies in existing conditions have been corrected.
- C. Verify that dimensions, tolerances, and attachment methods for work in this section are properly coordinated with other work on site.

3.02 INSTALLATION, GENERAL

- A. Install in accordance with manufacturer's written instructions.
 - 1. Do not install damaged, warped, bowed, dented, abraded, or otherwise defective units.
 - 2. Do not install when ambient or substrate temperature has been below 40 degrees F during the preceding 8 daylight hours.
- B. Field Adjustment:
 - 1. Locate relative to curb line in compliance with ATBCB PROWAG, Sections 304 and 305.
 - 2. Orient so dome pattern is aligned with the direction of ramp.
- C. Install units fully seated to substrate, square to straight edges and flat to required slope.

3.03 INSTALLATION, SURFACE APPLIED PLASTIC TILES

- A. Cure concrete surfaces for a minimum of 4 days before installing units.
- B. Mechanically roughen surface as required to remove contaminants and prepare surface for adhesive and sealant application.
- C. Drill fastener holes straight, true and to depth recommended by manufacturer.
- D. Apply adhesive to back of unit as recommended by manufacturer.
- E. Mechanically fasten to substrate. Avoid striking or damaging the unit itself during installation.
- F. Apply sealant to edges in cove profile.

3.04 PROTECTION

- A. Protect installed units from traffic, subsequent construction operations or other imposed loads until concrete is fully cured.
- B. Touch-up, repair or replace damaged products prior to Date of Substantial Completion.

Section 32 18 13
Synthetic Turf Surfacing For Landscaping

GENERAL

1.01 SUMMARY

- A. This Section includes the following:
 - 1. Synthetic turf surfacing, including artificial turf, [subbase preparation and placement of aggregate base course, and turf infill.

1.02 REFERENCES

- A. ASTM D1335 - Standard Test Method for Tuft Bind of Pile Yarn Floor Coverings; 2017, with Editorial Revision (2018).
- B. ASTM D2256/D2256M - Standard Test Method for Tensile Properties of Yarns by the Single-Strand Method; 2010 (Reapproved 2015).
- C. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials; 2006 (Reapproved 2011).
- D. ASTM D5034 - Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test); 2021 (Reapproved 2025).
- E. ASTM D5823 - Standard Test Method for Tuft Height of Pile Floor Coverings; 2013.
- F. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings; 2020a.
- G. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
- H. ASTM F1292 - Standard Specification for Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment.
- I. ASTM F1951 - Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Conference: Conduct conference at Project site following award of contract. Review methods and procedures related to synthetic turf surfacing installation including, but not limited to, the following:
 - 1. Review survey of subbase conditions.
 - 2. Review delivery, storage, and handling procedures.

1.04 ACTION SUBMITTALS

- A. Product Data: For each type of product specified.
- B. Shop Drawings: Provide installation details including roll and seaming layout, methods of attachment and details at penetrations and terminations
 - 1. Show layout of marking plan if any, indicating details for specified activity areas.
- C. Samples: For each type of synthetic turf surfacing indicated.
 - 1. Minimum 12-by-12-inch- square sample of synthetic turf surface with tufted perimeter line and carpet seam.

1.05 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Installation Schedule: Showing planned commencement and completion dates for each portion of the Work; include critical dates indicated on Owner's project schedule.
- C. Warranty: Sample warranty specified in this Section.

1.06 MAINTENANCE MATERIAL SUBMITTALS.

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Seaming Materials: Sufficient quantity for 1,320 sq. ft.
 - 2. Synthetic Turf Fiber: Sufficient quantity for 1,320 sq. ft.
 - 3. Infill Material: Sufficient quantity for 1,320 sq. ft., in weatherproof bags.

1.07 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing synthetic turf surfacing materials similar to those specified for this project, with a record of successful service for a minimum of 5 years.
- B. Installer Qualifications: An experienced Installer certified by the manufacturer, employing workers trained and approved by manufacturer.
- C. Source Limitations: Obtain synthetic turf surfacing materials through one source from a single manufacturer.
 - 1. Provide secondary materials including adhesives, paint, thread, and repair materials of type and from source recommended by manufacturer of synthetic turf surfacing materials.

1.08 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit synthetic turf surfacing installation to be performed according to manufacturers' written instructions and warranty requirements.

1.09 COORDINATION

- A. Coordinate installation of synthetic turf surfacing's with installation of site paving, playground equipment, adjacent lawns, landscaping materials, site lighting, and related work.

1.10 WARRANTY

- A. Manufacturer's Warranty: Submit manufacturer's standard published limited warranty form in which manufacturer agrees to repair or replace components of synthetic turf surfacing installation installed by manufacturer-certified Installer that fail in materials under normal use and maintenance, or provide other relief, within specified warranty period.
 - 1. Failures include ultraviolet degradation, backing integrity, more than 50 percent loss of face fiber, and loss of tuft bind strength.
 - 2. Warranty Period: Life of product.
- B. Installer Project Warranty: Submit synthetic turf surfacing Installer's warranty, signed by Installer, covering the Work of this Section, including installation of all components of synthetic turf surfacing system, for the following warranty period:
 - 1. Warranty Period: Two years from date of Substantial Completion.

PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design Manufacturer: Subject to requirements of this Section, provide listed products of SYNLawn, Dalton GA 30721; (866) 796-5296; info@synlawn.com; www.synlawn.com.
 - 1. Submit requests for substitution in accordance with Instructions to Bidders and Division 01 General Requirements.
- B. Source Limitations: Obtain synthetic turf surfacing materials through one source from a single manufacturer.
 - 1. Provide secondary materials including adhesives, paint, thread, and repair materials of type and from source recommended by manufacturer of synthetic turf surfacing materials.

2.02 PERFORMANCE REQUIREMENTS

- 1. Basis of Design Product: SYNLawn SYNAugustine 347.
- 2. Artificial Turf Fiber and Construction Characteristics:
 - a. Yarn, Turf Zone: Polyethylene; Biomimetic U.
 - 1) Color: Field green/Olive/Apple.
 - 2) Denier, ASTM D1577: 9900/9.
 - 3) Antimicrobial Protection: Sanitized®
 - 4) Antistatic Protection: StatBlock™
 - 5) IR Reflective: DualChill™
 - b. Yarn, Thatch Zone: Polyethylene.
 - 1) Color: Field green/Beige.
 - 2) Denier: 5000/8.
 - c. Finished Pile Height, ASTM D5823, : 1-7/8 inch.
 - d. Finished Pile Weight, ASTM D5848: 75 oz/sq. yd.

- e. Tuft Machine Gauge: 3/8 inch.
- f. Backing, Primary: Polypropylene, 2 layers with fiber-reinforcing core.
- g. Backing, Secondary: 22 oz. urethane.
 - 1) Enviroloc+™
 - (a) Anti Fungi and Anti Algae blended into secondary backing.
- h. Total Weight: 103 oz./sq. yd.
- i. Infill: Silica sand ballast.
- j. Temperature-Reducing Infill: Silica sand and moisture-retaining coated sand ballast.
- 3. Performance Characteristics:
 - a. Tuft Bind, ASTM D1335: Not less than 8 lb.
 - b. Grab tear strength, ASTM D5034 : Not less than 200 lbf.
 - c. Elongation to break, ASTM D2256/D2256M : Not less than 30 percent.
 - d. Yarn breaking strength, ASTM D5793: Not less than 20 lb.
 - e. Flammability, ASTM D2859 : Pass.
 - f. Fire Test Exposure, ASTM E108: Class A
 - g. Heavy Metal Analysis, EN71-3

EXECUTION

3.01 EXAMINATION

- A. Examine synthetic turf surfacing base and perimeter conditions, with Installer present, for compliance with requirements for installation tolerances, and other conditions affecting performance of the Work.
 - 1. Verify substrate meets profile required.
 - 2. Confirm base material, compaction of substrate, permeability, and drainage system installation meets requirements.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 SUBBASE PREPARATION

- A. General: Prepare substrates to receive surfacing products according to synthetic turf surfacing manufacturer's written instructions. Verify that substrates are sound and without high spots, ridges, holes, and depressions. Remove organic debris. Grade soil subgrade level and compact.
- B. Finish grade soil subgrade with slope between 0.5 percent and 1.0 percent toward path of site drainage.
 - 1. Compact subgrade in both directions with mechanical compacting equipment to achieve specified compaction at 90 percent standard Proctor.
 - 2. Prepare subgrade to tolerance of within 0.5 inch of design grade.
 - 3. Prepare subgrade within 0.25 inch in 10 feet in any direction from design grade over entire playing surface.

3.03 AGGREGATE COURSE INSTALLATION

- A. Place aggregate base course, compact by tamping with plate vibrator to 90 percent of ASTM D 1557 maximum laboratory density, and screed to depth indicated. Install 4-inch base course unless otherwise indicated.
 - 1. Slope base course between 0.5 percent and 1.0 percent, measured from the longitudinal center of the installation towards the edges. Grade base course to tolerance of within 0.5 inch of design grade, and with a maximum variation of 0.25 inch in 10 feet in any direction.
- B. Install curbing and perimeter boards as indicated on approved submittals.

3.04 SYNTHETIC TURF INSTALLATION

- A. General: Comply with synthetic turf surfacing manufacturer's written installation instructions. Install synthetic turf surfacing over area and in thickness indicated.
- B. Fall Pad: Place fall pads tightly abutted over area to receive synthetic turf surfacing. Tape seams with pad seam tape to secure pads in position prior to installing synthetic turf.
- C. Artificial Turf: Loose-lay artificial turf and allow fabric to relax for period recommended by manufacturer. Stretch turf sheet and attach at perimeter and in field of turf in accordance with approved submittals.
- D. Seaming: Form seams flat and snug, with no gaps or fraying. Remove yarns that are trapped within seams. Form seams as recommended in synthetic turf manufacturer's written instructions using manufacturer's provided or recommended materials.

3.05 INSTALLATION, INFILL

- A. Mix and install infill material components in accordance with manufacturer's requirements for approved system. Groom material and leave surface ready for use.

3.06 PROTECTION

- A. Protect completed installation from damage. Prevent traffic over system prior to acceptance by Owner.

3.07 DEMONSTRATION

- A. Instruct Owner's personnel in proper inspection and maintenance of synthetic turf surfacing. Review manufacturer's recommended maintenance procedures and warranty terms and conditions.

END OF SECTION

Section 32 31 19
Decorative Metal Fences and Gates

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Decorative steel picket fences.
- B. Decorative steel single rolling vehicle gate system.
- C. Decorative steel picket single vehicle swing gate system.
- D. Decorative steel picket single pedestrian swing gate.
- E. Automatic gate operators complete with safety devices, proximity reader and radio signal remote.
- F. Pedestal for gate operator with housing for operators
- G. Detection loops in pavement
- H. Coordination with work in Division 26 Electrical
- I. Coordination with work in Division 27 Communications

1.02 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete.
- B. Section 04 20 00 - Unit Masonry
- C. Section 08 71 00 - Door Hardware
- D. Division 26 - Electrical
- E. Division 27 - Communications
- F. Section 31 23 16 - Excavation.
- G. Section 32 12 16 - Asphalt Paving
- H. Section 32 13 13 - Concrete Paving

1.03 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.

- B. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus; 2011.
- C. ASTM D523 - Standard Test Method for Specular Gloss; 2014.
- D. ASTM D714 - Test Method for Evaluating Degree of Blistering in Paint; 2002 (Reapproved 2009).
- E. ASTM D822/D822M - Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings; 2013.
- F. ASTM D1654 - Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments; 2008.
- G. ASTM D2244 - Standard Practice for Calculation of Color Differences from Instrumentally Measured Color Coordinates; 2011.
- H. ASTM D2794 - Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact); 1993 (Reapproved 2010).
- I. ASTM D3359 - Test Method for Measuring Adhesion by Tape Test; 2009.
- J. ASTM F2200 - Standard Specification for Automated Vehicular Gate Construction; 2014.
- K. ASTM F2408 - Standard Specification for Ornamental Fences Employing Galvanized Steel Tubular Pickets; 2016.
- L. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
- M. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- N. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- O. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- P. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.
- Q. UL 991 - Standard for Tests for Safety-Related Controls Employing Solid-State Devices; 2004.

1.04 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. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.

- C. Shop Drawings:
 - 1. Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, gates, and schedule of components including:
 - a. Gate elevations indicating the Finish Grade along the length of the gate.
 - b. Post foundations details.
 - c. Gate hardware (including hinges, latches, drop bar for inactive leaf, card reader system, details, etc.).
 - d. Gate operator details.
- D. Installer's Qualification Statement.
- E. Manufacturer's Warranty.
- F. Maintenance Data: Indicate lubrication requirements and frequency and periodic adjustments required.

1.05 QUALITY ASSURANCE

- A. Products Requiring Electrical Connection: Listed and classified by testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.
- B. Installer Qualifications: Experienced with type of construction involved and materials and techniques specified and approved by fence manufacturer.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Upon receipt at the job site, all materials shall be checked to ensure that no damages occurred during shipping or handling.
- B. Store materials in a manner to ensure proper ventilation and drainage. Protect against damage, weather, vandalism and theft.

1.07 WARRANTY

- A. Correct defective Work within a one year period after Date of Substantial Completion.
- B. Provide five year manufacturer warranty for commercial gate operator.
- C. Provide manufacturers finish warranty against cracking, peeling, chipping, blistering or corroding for a period of 10 years

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Decorative Metal Fences and Gates:
 - 1. Ameristar Perimeter Security, USA: www.ameristarfence.com/#sle. (Basis of Design)
 - 2. Builders Fence Company; buildersfence.com

- B. Automatic Gate Operators:
1. LiftMaster; www.liftmaster.com
 2. HySecurity; hysecurity.com
 3. Maximum Controls: max.us.com

2.02 FENCES

- A. Fences: Complete factory-fabricated system of posts and panels, accessories, fittings, and fasteners; finished with electrodeposition coating, and having the following performance characteristics:
1. Capable of resisting vertical load, horizontal load and infill performance requirements for industrial fence as defined in ASTM F2408.
- B. Electro-Deposition Coating: Multistage pretreatment/wash with zinc phosphate, followed by epoxy primer and acrylic topcoat.
1. Total Coating Thickness: 2 mils, minimum.
 2. Color: As shown on drawings.
 3. Coating Performance: Comply with general requirements of ASTM F2408.
 - a. Adhesion: ASTM D3359 (Method B); Class 3B with 90 percent or more of coating remaining in tested area.
 - b. Corrosion Resistance: ASTM B117, ASTM D714 and ASTM D1654; 1/8 inch coating loss or medium No.8 blisters after 1,500 hours.
 - c. Impact Resistance: ASTM D2794; 60 inch pounds.
 - d. Weathering Resistance: ASTM D523, ASTM D822/D822M and ASTM D2244; less than 60 percent loss of gloss.
- C. Steel: ASTM A653/A653M; tensile strength 45,000 psi, minimum.
1. Hot-dip galvanized; ASTM A653/A653M, G60.
 2. 62 percent recycled steel, minimum.

2.03 WELDED STEEL FENCE AND GATES

- A. Provide fence meeting requirements for industrial class as defined by ASTM F2408.
- B. Fence Panels: Fusion welded; 7 feet height
1. Fence Style: Majestic
 2. Panel Style: Three rail.
 3. Attach panels to posts with manufacturer's standard panel brackets.

- C. Fence Posts:

<u>Fence Post</u>	<u>Panel Height</u>
2-1/2" x 12 Ga.	Up to & Including 6' Height
3" x 12 Ga.	Over 6' Up to & Including 8' Height

- D. 3' Single Gate, height to match fence
1. Style: To match fence
 2. Panel Style: To match fence

- E. Gate posts to be sized per manufacturer's recommended minimum sizes based on gate width and height.

Gate Leaf	Gate Height		
	Up to & Including 4'	Over 4' Up to & Including 6'	Over 6' Up to & Including 8'
Up to 4'	2-1/2" x 12 Ga.	3" x 12 Ga.	3" x 12 Ga.
4'1" to 6'	3" x 12Ga.	4" x 11 Ga.	4" x 11 Ga.
6'1" to 8'	3" x 12 Ga.	4" x 11 Ga.	6" x 3/16"
8'1" to 10'	4" x 11 Ga.	6" x 3/16"	6" x 3/16"
10'1" to 12'	4" x 11 Ga.	6" x 3/16"	6" x 3/16"
12'1" to 14'	4" x 11 Ga.	6" x 3/16"	6" x 3/16"
14'1" to 16'	6" x 3/16"	6" x 3/16"	6" x 3/16"

1. Post Cap: Standard

- F. Fence Rails: Manufacturer's standard, double-wall steel channel 1-3/4 inch square by 12 gauge, 0.1094 inch with prepunched picket holes.

1. Picket Retaining Rods: 0.125 inch galvanized steel.
2. Picket-to-Rail Intersection Seals: PVC grommets.

- G. Fence Pickets: Steel tube.

1. Spacing: 3-3/4 inch clear.
2. Size: 1 inch square by 18 gauge, 0.0478 inch.
3. Style: Pickets with finial extend above top rail.
4. Finial: Angled spear, Invincible.

- H. Flexibility: Capable of following variable slope of up to 1:2.

2.04 PERFORATED STEEL SCREENS

- A. Perforated Steel Screen:

1. Holes: 1/4 inch diameter round
2. Pattern: 5/16 inch staggered rows, 58% open area.
3. Thickness: 20 gauge

- B. Contractor to provide all attachments necessary to provide a complete screening device.

- C. Manufacturer:

1. McNichols: www.mcnichols.com (Basis of Design)
2. Direct Metals: www.directmetals.com

2.05 AUTOMATIC GATE OPERATORS

- A. Swinging Gates: Pre-wired, pedestal mounted gate operator for horizontal swinging gates, per ASTM F2200 and UL 325.

1. Class: Class II.
2. Operating type: Swing arm.
3. Control Functions: Open, pause, and close.

4. Open/Close Time: Operator to utilize slow start and slow close functions
 5. Access: Keypad and Remote.
 6. Maximum gate weight: 1,300 lbs for a 12 foot gate.
 7. Horsepower Rating: Suitable for connected load.
 8. Monitoring and Controls:
 - a. Internet connectivity
 - b. Radio receiver
 - c. Auxiliary relays
 9. Motor: 24 Volt DC, continuous duty type
 10. Entrapment Protection Devices: Provide sensing devices and safety mechanisms complying with UL 325 and UL 991.
 - a. Primary Device: Provide NEMA 4X photo eye sensors as required with momentary-contact control device.
 - b. Secondary Device: Provide electric sensing edge with wireless edge kit or non-monitored safety edge as an option along with continuous-constant control device.
 11. Enclosures: Comply with NEMA EN 10250, and list and label as complying with UL 50 and UL 50E.
 - a. Environment Type per NEMA EN 10250: Unless otherwise indicated, as specified for the following installation locations:
 - 1) Outdoor Locations, direct splashing: Type 4.
 12. Products:
 - a. Liftmaster Model CSW24UL ; www.liftmaster.com
 - b. HySecurity SwingSmart DC 20 ; hysecurity.com
 - c. Maximum Controls Megatron 1400 Pro ; max.us.com
- B. Slide Gates: Prewired, pedestal-mounted gate operator for horizontal slide gates, per ASTM F2200 and UL 325.
1. Operating type: Gear drive.
 2. Control Functions: Open, Pause, Close.
 3. Maximum Open/Close Speed: One foot per second in conformance with UL 325
 4. Access: Card.
 5. Size: Unit to handle gate length as indicated on Drawings.
 6. Horsepower Rating: Suitable for connected load.
 7. Timer: Unit to have adjustable 0-60 second hold open timer.
 8. Cycles: Unit to be rated to 35 cycles per hour minimum.
 9. Parts: Permanently lubricated continuous duty worm gear reduction and reliable rotary limits on output shaft to ensure accurate open and closed gate positions. All bearings to be permanently lubricated.
 10. Braking: Electronic braking system, self-locking in both the open and closed positions. Unit to have full systems capability and soft start/stop protection for mechanical parts.
 11. Safety: Internal safety sensing devices, obstruction sensing in both the opening and closing directions, stop circuit for pedestrian doors, and manual operation switch.
 12. Options: Surge suppression, steel mounting stand, and audible gate movement warning siren.
 13. Keypads: Coordinate gate operator with keypad and card reader mounted at high/low pedestal, as shown on Drawings.
 14. Warning signs to be provided and installed as part of this work on both sides of each gate controlled by an operator. Sign to be mounted on a minimum of 0.063" aluminum and shall be screen printed.

15. Entrapment Protection Devices: Provide sensing devices and safety mechanisms complying with UL 325.
 - a. Primary Device: Provide NEMA 4X photo eye sensors as required with momentary-contact control device.
 - b. Secondary Device: Provide electric sensing edge with wireless edge kit or non-monitored safety edge as an option along with continuous-constant control device.
16. Enclosures: Comply with NEMA EN 10250, and list and label as complying with UL 50 and UL 50E.
 - a. Environment Type per NEMA EN 10250: Unless otherwise indicated, as specified for the following installation locations:
17. Products:
 - a. Liftmaster Model ISL24UL ; www.liftmaster.com
 - b. HySecurity Slide DriverII SD40 ; hysecurity.com
 - c. Maximum Controls Megatron Max 2000 ; max.us.com

2.06 ACCESSORIES

- A. Pedestal Mounting Supports: Provide mounting supports for keypad/access control installation.
 1. Products:
 - a. StrongPoles, LLC; Dual Height Keypad Pedestal: www.strongpoles.com/#sle.
 - b. Engineered Parking Systems; Style 4, Dual Height :www.engineeredparkingsystems.com

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Set fence posts in accordance with the manufacturer recommended spacing.
- C. When cutting rails immediately seal the exposed surfaces by:
 1. Removing metal shavings from cut area.
 2. Apply zinc-rich primer to thoroughly cover cut edge and drilled hole; allow to dry.
 3. Apply two coats of custom finish spray paint matching fence color.
 4. Failure to seal exposed surfaces in accordance with manufacturer's instructions will negate manufacturer's warranty.
- D. Install operator in accordance with manufacturer's instructions and in accordance with NFPA 70.

3.03 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch.

3.04 CLEANING

- A. Clean jobsite of excess materials; scatter excess material from post hole excavations uniformly away from posts. Remove excess material if required.
- B. Clean fence with mild household detergent and clean water rinse well.
- C. Remove mortar from exposed posts and other fencing material using a 10 percent solution of muriatic acid followed immediately by several rinses with clean water.
- D. Touch up scratched surfaces using materials recommended by manufacturer. Match touched-up paint color to factory-applied finish.

3.05 CLOSEOUT ACTIVITIES

- A. Demonstration: Demonstrate operation of system to County's personnel.
 - 1. Use operation and maintenance data as reference during demonstration.
 - 2. Briefly describe function, operation, and maintenance of each component.
- B. Training: Train County's personnel on operation and maintenance of system.
 - 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
 - 2. Location: At project site.

3.06 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair, or replace damaged products before Date of Substantial Completion.

END OF SECTION

**Section 32 33 13
Site Bicycle Racks**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Exterior bicycle racks.

1.02 RELATED REQUIREMENTS

- A. Section 32 13 13 - Concrete Paving: Mounting surface for bicycle racks.

1.03 REFERENCE STANDARDS

- A. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Handle racks with sufficient care to prevent scratches and other damage to the finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Exterior Bicycle Racks:
 - 1. Columbia Cascade Company; Cycloops 2170: www.timberform.com/#sle. (Basis of Design)
 - 2. Huntco Supply, LLC: www.huntco.com/#sle.
 - 3. MADRAX, a brand of Graber Manufacturing, Inc; U190: www.madrax.com/#sle.

2.02 BICYCLE RACKS

- A. Exterior Bicycle Racks: Device allows user-provided lock to simultaneously secure one wheel and part of the frame on each bicycle parked or racked.
 - 1. Style: Inverted horseshoe rack formed by one u-shaped bend of round pipe.
 - 2. Capacity: Two bicycles.
 - 3. Mounting, Ground: In-ground anchor.
 - 4. Finish: Powder coat, maintenance-free and weather-resistant.
 - 5. Color: As selected by Architect from manufacturer's standard range.
- B. Materials:
 - 1. Pipe: Carbon steel, ASTM A53/A53M, Schedule 40.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine surfaces to receive bicycle racks.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory conditions before proceeding.
- C. Do not begin installation until unsatisfactory conditions are corrected.

3.02 PREPARATION

- A. Ensure surfaces to receive bicycle racks are clean, flat, and level.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install level, plumb, square, and correctly located as indicated on drawings.
- C. In-Ground Anchor Installation:
 - 1. Prepare holes in size according to manufacturer's instructions.
 - 2. Place anchoring bolts through the holes in pipe.
 - 3. Lower rack into holes, ensuring the bottom of lower bends are at least 1-1/2 inch from the ground.
 - 4. Place concrete.
 - 5. Level rack before concrete sets.
 - 6. Support until dry.

3.04 CLEANING

- A. Clean installed work to like-new condition. Do not use cleaning materials or methods that could damage finish.

3.05 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

**Section 32 84 23
Underground Sprinklers**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Pipe and fittings, valves, emitters, bubblers, and accessories.
- B. Control system.

1.02 RELATED REQUIREMENTS

- A. The Standard Plans and Specifications of the County of Madera take precedence over all specifications in this section. The contractor is required to obtain a copy of the County documents and utilize them in all cases where there is any conflict between these specifications and those of the City.
- B. Section 31 23 16 - Excavation: Excavating for irrigation piping.
- C. Section 31 23 16.13 - Trenching: Excavating and backfilling for irrigation piping.
- D. Section 31 23 23 - Fill: Backfilling for irrigation piping.

1.03 SUBMITTALS

- A. Submit manufacturer's product data and installation instructions for each of the system components. No substitutions will be allowed without prior approval by the Landscape Architect.
- B. Product Data: Provide component and control system and wiring diagrams.
- C. Shop Drawings: Indicate piping layout to water source, location of sleeves under pavement, location and components, plant and landscaping features, site structures, schedule of fittings to be used.
- D. Operation and Maintenance Data:
 - 1. Provide instructions for operation and maintenance of system and controls, seasonal activation and shutdown, and manufacturer's parts catalog.
 - 2. Provide schedule indicating length of time each valve is required to be open to provide a determined amount of water.
- E. Record Documents: Record actual locations of all concealed components piping system.
- F. Maintenance Materials: Provide the following for County's use in maintenance of project.
 - 1. See Section 01 61 00 - Product Requirements, for additional provisions.
 - 2. Extra Valve Keys for Manual Valves: One.

- 3. Extra Valve Box Keys: One.
- 4. Radio Maintenance Remote

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years of experience.

PART 2 PRODUCTS

2.01 IRRIGATION SYSTEM

- A. All products and materials to be per the plan, or equal. If discrepancies exist between these plans and the County Standards, the County Standards shall prevail.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify location of existing utilities.
- B. Verify that required utilities are available, in proper location, and ready for use.

3.02 PREPARATION

- A. Piping layout indicated is diagrammatic only. Route piping to avoid plants, ground cover, and structures.
- B. Layout and stake locations of system components.
- C. Review layout requirements with other affected work. Coordinate locations of sleeves under paving to accommodate system.

3.03 TRENCHING

- A. Trench and backfill in accordance with Section 31 23 16 and Section 31 23 23.
- B. Trench to accommodate grade changes and slope to drains.
- C. Maintain trenches free of debris, material, or obstructions that may damage pipe.

3.04 INSTALLATION

- A. Install pipe, valves, controls, and outlets in accordance with manufacturer's instructions.

- B. Connect to utilities.
- C. Set outlets and box covers at finish grade elevations.
- D. Use threaded risers to each outlet.
- E. After piping is installed, but before outlets are installed and backfilling commences, open valves and flush system with full head of water.

3.05 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01 40 00 - Quality Requirements.
- B. Prior to backfilling, test system for leakage at main piping to maintain static pressure for one hour.
- C. System is acceptable if no leakage or loss of pressure occurs.

3.06 BACKFILLING

- A. Backfill trench and compact to specified subgrade elevation. Protect piping from displacement.

3.07 SYSTEM STARTUP

- A. Prepare and start system in accordance with manufacturer's instructions.
- B. Adjust control system to achieve time cycles required.

3.08 CLOSEOUT ACTIVITIES

- A. Instruct County's personnel in operation and maintenance of system. Use operation and maintenance data as basis for demonstration.

3.09 MAINTENANCE

- A. See Section 01 70 00 - Execution and Closeout Requirements, for additional requirements relating to maintenance service.
- B. Provide one complete spring start-up and a fall shutdown by installer, at no extra cost to County.

End of Section

Section 32 93 00

Plants

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Preparation of subsoil.
- B. Topsoil bedding.
- C. New trees, plants, and ground cover.
- D. Mulch and Fertilizer.
- E. Maintenance.

1.02 RELATED REQUIREMENTS

- A. The Standard Plans and Specifications of the County of Madera take precedence over all specifications in this section. The contractor is required to obtain a copy of the County documents and utilize them in all cases where there is any conflict between these specifications and those of the County.
- B. Section 31 22 00 - Grading: Topsoil material.
- C. Section 31 23 23 - Fill: Topsoil material.

1.03 DEFINITIONS

- A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.04 REFERENCE STANDARDS

- A. ANSI A300 Part 1 - American National Standard for Tree Care Operations -- Tree, Shrub and Other Woody Plant Maintenance -- Standard Practices; 2008.
- A. ANSI/AHIA Z60.2 - American Standard for Nursery Stock; 2025.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

- B. Maintenance Data: Include cutting and trimming method ; types, application frequency, and recommended coverage of fertilizer .
- C. Submit list of plant life sources.
- D. Maintenance Contract.

1.06 QUALITY ASSURANCE

- A. Nursery Qualifications: Company specializing in growing and cultivating the plants with three years documented experience.
- B. Maintenance Services: Performed by installer.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.
- B. Protect and maintain plant life until planted.
- C. Deliver plant life materials immediately prior to placement. Keep plants moist.

1.08 FIELD CONDITIONS

- A. Do not install plant life when ambient temperatures may drop below 35 degrees F .
- B. Do not install plant life when wind velocity exceeds 30 mph.

1.09 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide one year warranty.
- C. Warranty: Include coverage for one continuous growing season; replace dead or unhealthy plants.
- D. Replacements: Plants of same size and species as specified, planted in the next growing season, with a new warranty commencing on date of replacement.

1.10 MAINTENANCE (SEE END OF SECTION)

- A. Provide a separate maintenance contract for specified maintenance service.

PART 2 PRODUCTS

2.01 PLANTS

- A. Plants: Species and size identified in plant schedule, grown in climatic conditions similar to those in locality of the work.

2.02 SOIL MATERIALS

2.03 SOIL AMENDMENT MATERIALS

2.04 MULCH MATERIALS

- A. Mulching Material: Bark mulch, free from weeds, foreign matter detrimental to plant life, and dry.

2.05 ACCESSORIES

- A. Wrapping Materials: Burlap.
- B. Stakes: Softwood lumber, pointed end.
- C. Cable, Wire, Eye Bolts and Turnbuckles: Non-corrosive, of sufficient strength to withstand wind pressure and resulting movement of plant life.

2.06 SOURCE QUALITY CONTROL

- A. Provide analysis of topsoil; comply with requirements of Section 01 40 00.
- B. Provide testing of imported topsoil.
- C. Testing is not required if recent tests are available for imported topsoil. Submit these test results to the testing laboratory for approval. Indicate, by test results, information necessary to determine suitability.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that prepared subsoil and planters are ready to receive work.
- B. Saturate soil with water to test drainage.
- C. Verify that required underground utilities are available, in proper location, and ready for use.

3.02 PREPARATION OF SUBSOIL

- A. Prepare subsoil to eliminate uneven areas. Maintain profiles and contours. Make changes in grade gradual. Blend slopes into level areas.
- B. Remove foreign materials, weeds and undesirable plants and their roots. Remove contaminated subsoil.
- C. Scarify subsoil to a depth of 3 inches where plants are to be placed. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted subsoil.
- D. Dig pits and beds 6 inches larger than plant root system.

3.03 PLACING TOPSOIL

- A. Spread topsoil to a minimum depth of 4 inches over area to be planted. Rake smooth.
- B. Place topsoil during dry weather and on dry unfrozen subgrade.
- C. Remove vegetable matter and foreign non-organic material from topsoil while spreading.
- D. Grade topsoil to eliminate rough, low or soft areas, and to ensure positive drainage.
- E. Install topsoil into pits and beds intended for plant root balls, to a minimum thickness of 6 inches.

3.04 FERTILIZING

- A. Apply fertilizer in accordance with manufacturer's instructions.
- B. Apply after initial raking of topsoil.
- C. Mix thoroughly into upper 2 inches of topsoil.
- D. Lightly water to aid the dissipation of fertilizer.

3.05 PLANTING

- A. Place plants for best appearance.
- B. Set plants vertical.
- C. Remove non-biodegradable root containers.
- D. Set plants in pits or beds, partly filled with prepared plant mix, at a minimum depth of 6 inches under each plant. Remove burlap, ropes, and wires, from the root ball.
- E. Place bare root plant materials so roots lie in a natural position. Backfill soil mixture in 6 inch layers. Maintain plant life in vertical position.

- F. Saturate soil with water when the pit or bed is half full of topsoil and again when full.

3.06 FIELD QUALITY CONTROL

- A. Perform field inspection and testing in accordance with Section 01 40 00.
- B. Plants will be rejected if a ball of earth surrounding roots has been disturbed or damaged prior to or during planting.

3.07 MAINTENANCE

- A. Provide maintenance at no extra cost to County; County will pay for water.
- B. Irrigate sufficiently to saturate root system and prevent soil from drying out.
- C. Cultivate and weed plant beds and tree pits.
- D. Remove dead or broken branches and treat pruned areas or other wounds.
- E. Neatly trim plants where necessary.
- F. Immediately remove clippings after trimming.
- G. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions.
- H. Control insect damage and disease. Apply pesticides in accordance with manufacturers instructions.
- I. Remedy damage from use of herbicides and pesticides.
- J. Replace mulch when deteriorated.
- K. Maintain wrappings, guys, turnbuckles, and stakes. Adjust turnbuckles to keep guy wires tight. Repair or replace accessories when required.

END OF SECTION

Section 33 0110.58
Disinfection of Water Utility Piping Systems

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Disinfection of site domestic water lines and site fire water lines specified in Section 33 1416.
- B. Disinfection of building domestic water piping specified in Section 22 1005.

1.02 RELATED REQUIREMENTS

- A. Section 33 1416 - Site Water Utility Distribution Piping.
- B. Root Creek Water District Standard Specifications

1.03 REFERENCE STANDARDS

- A. AWWA B300 - Hypochlorites 2018.
- B. AWWA B301 - Liquid Chlorine 2018.
- C. AWWA B302 - Ammonium Sulfate 2016.
- D. AWWA B303 - Sodium Chlorite 2018.
- E. AWWA C651 - Disinfecting Water Mains 2014, with Addendum (2020).

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Test Reports: Indicate results comparative to specified requirements.
- C. Certificate: Certify that cleanliness of water distribution system meets or exceeds specified requirements.
- D. Disinfection report:
 - 1. Type and form of disinfectant used.
 - 2. Date and time of disinfectant injection start and time of completion.
 - 3. Test locations.
 - 4. Initial and 24 hour disinfectant residuals (quantity in treated water) in ppm for each outlet tested.
 - 5. Date and time of flushing start and completion.
 - 6. Disinfectant residual after flushing in ppm for each outlet tested.

E. Bacteriological report:

1. Date issued, project name, and testing laboratory name, address, and telephone number.
2. Time and date of water sample collection.
3. Name of person collecting samples.
4. Test locations.
5. Initial and 24 hour disinfectant residuals in ppm for each outlet tested.
6. Coliform bacteria test results for each outlet tested.
7. Certification that water complies, or fails to comply, with bacterial standards of Root Creek Water District.

1.05 QUALITY ASSURANCE

- A. Water Treatment Firm: Company specializing in disinfecting potable water systems specified in this Section with minimum three years documented experience.
- B. Testing Firm: Company specializing in testing potable water systems, certified by governing authorities of California.
- C. Submit bacteriologist's signature and authority associated with testing.

PART 2 PRODUCTS

2.01 DISINFECTION CHEMICALS

- A. Chemicals: AWWA B300 Hypochlorite, AWWA B301 Liquid Chlorine, AWWA B302 Ammonium Sulfate, AWWA B303 Sodium Chlorite, AWWA B300 Hypochlorite, AWWA B301 Liquid Chlorine, AWWA B302 Ammonium Sulfate, AWWA B303 Sodium Chlorite, AWWA B300 Hypochlorite, AWWA B301 Liquid Chlorine, AWWA B302 Ammonium Sulfate, AWWA B303 Sodium Chlorite, AWWA B300 Hypochlorite, AWWA B301 Liquid Chlorine, AWWA B302 Ammonium Sulfate, and AWWA B303 Sodium Chlorite.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that piping system and water well has been cleaned, inspected , and pressure tested.
- B. Schedule disinfecting activity to coordinate with start-up, testing, adjusting and balancing, demonstration procedures, including related systems.

3.02 DISINFECTION

- A. Use method prescribed by the applicable state or local codes, or health authority or water purveyor having jurisdiction, or in the absence of any of these follow AWWA C651.
- B. Provide and attach equipment required to perform the work.
- C. Inject treatment disinfectant into piping system.
- D. Maintain disinfectant in system for 24 hours.
- E. Flush, circulate, and clean until required cleanliness is achieved; use municipal domestic water.
- F. Replace permanent system devices removed for disinfection.
- G. Pressure test system to 200 psi. Repair leaks and re-test.

3.03 FIELD QUALITY CONTROL

- A. Perform field inspection and testing in accordance with Section 01 4000.
- B. Test samples in accordance with AWWA C651.

END OF SECTION

Section 33 0513
Manholes and Structures

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Installation of pre-cast concrete manholes and structures
- B. All work on-site and off-site shall conform to the latest edition of the Root Creek District Standard Specifications, Madera County Standard Plans and Specifications, California Building Code 2022 edition including appendices thereto, as published by the California Building Standards Commission, and all applicable governmental agencies.

1.02 RELATED REQUIREMENTS

- A. Root Creek Water District Standard Specifications
- B. Section 31 2316.13 - Trenching: Excavating, bedding, and backfilling.
- C. Section 33 3113 – Site Sanitary Gravity Piping.

1.03 PRICE AND PAYMENT PROCEDURES

- A. See Section 01 2200 - Unit Prices, for additional unit price requirements.

1.04 QUALITY ASSURANCE – SANITARY SEWER MANHOLES

- A. Manholes shall be constructed in accordance with Root Creek Water District Standard Drawings S-5 through S-7 and as specified herein or directed by the Engineer.
- B. Maintain one copy of Root Creek Water District Standard Specifications on site.

1.05 SUBMITTALS

- A. Shop Drawings:
 - 1. Standard Fabrication: Indicate structure locations, elevations, sections, equipment support, piping sizes, and elevations of penetrations.
 - 2. Custom Fabrication: Indicate design, construction and installation details, typical reinforcement and additional reinforcement at openings for each custom type, size and configuration.
- B. Product Data: Submit manhole frames and lids, accessories, component construction, features, configuration, dimensions and joint data.
- C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- D. Project Record Documents: Record actual locations of manholes and structures with rim and invert elevations

- E. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities

PART 2 PRODUCTS

2.01 SANITARY SEWER MANHOLE AND STRUCTURE MATERIALS

- A. All pre-cast manholes and structures to be provided by Piranha Pipe & Precast, Inc.
- B. Invert channels shall be smooth and semicircular in shape conforming to the inside of the adjacent pipe invert, or flow channels may be provided by use of the bottom half of the specified main pipe.
- C. Tapered sections shall conform to the requirements for pipe of the size equal to the largest internal diameter of the tapered sections.
- D. The joints between all precast elements of the manhole, including adjustment rings and manhole frame, shall be filled with cement mortar, or approved equal, prior to joining the elements.

PART 3 EXECUTION

3.01 SANITARY SEWER MANHOLE DESIGN AND SPACING

- A. Sewer lines shall be laid straight between manholes, unless otherwise specified in the Plans and/or Specifications. The installation of lamp holes or clean-outs on public sewer mains is forbidden.
- B. Manholes are to be installed at the end of each line; at all changes in grade, size, or alignment; at all intersections; and at distances not greater than 500 feet.
- C. Service connections into manholes are discouraged, except in cul-de-sacs. Where permitted, the invert of Service connection shall not be installed above the top of the sewer main line.
- D. Manholes shall not be installed in sidewalks, flow channels of gutters, or in depressions subject to storm waters or other infiltration.

3.02 PREPARATION

- A. Do not install manholes and structures where site conditions induce loads exceeding structural capacity of manholes or structures.

3.03 EXCAVATION AND BACKFILL

- A. Excavate and backfill manholes and structures in location and to depth shown. Provide clearance around sidewalls of manhole or structure for construction operations and backfill.
- B. When groundwater is encountered, prevent accumulation of water in excavations. Place manholes or structures in dry trench.

3.04 PRE-CAST MANHOLE AND STRUCTURE INSTALLATION

- A. Install pre-cast manhole and structures at proper grade and alignment as shown on plans.
- B. Lift pre-cast structures and manholes at lifting points designated by manufacturer.
- C. When lowering structures into excavations and joining pipe to units, take precautions to ensure interior of pipeline and structure remain clean.
- D. Assemble multi-section structures by lowering each section into excavation. Install rubber gasket joints between precast sections in accordance with manufacturer's recommendations. Lower, set level, and firmly position base section before placing additional sections.
- E. Remove foreign materials from joint surfaces and verify sealing materials are placed properly. Maintain alignment between sections by using guide devices affixed to lower section.
- F. Joint sealing materials may be installed on site or at manufacturer's plant.
- G. Verify structures installed satisfy required alignment and grade.
- H. Remove knockouts or cut structure to receive piping without crating openings larger than required to receive pipe. Fill annular space with non-shrink grout.

3.05 CONNECTION TO EXISTING SEWER WITH MANHOLE

- A. Stake out location and burial depth of existing sewer line in area of proposed manhole or structure.
- B. Carefully excavate around existing sewer line to adequate depth for foundation slab installation. Protect existing pipe from damage.
- C. Prepare crushed stone bedding or other support system shown on Drawings, to receive foundation slab as specified for precast manholes and structures.
- D. Install manhole or structure around existing pipe in accordance with the appropriate paragraphs specified herein.
- E. Block upstream flow at existing manhole or structure with expandable plug.
- F. If flow is excessive, pump flow around new manhole to existing downstream manhole.
- G. Use hydraulic saw to cut existing pipe at manhole or structure entrance and exit and along pipe length at a point halfway up the outside diameter on each side of the pipe. Bottom half of pipe shall remain as manhole flow channel. Saw cut to have a smooth finish with top half of pipe flush with interior of manhole or structure.

END OF SECTION

Section 33 1416
Site Water Utility Distribution Piping

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Water pipe for site conveyance lines.
- B. Pipe valves.
- C. Fire hydrants.

1.02 RELATED REQUIREMENTS

- A. Section 09 9113 - Exterior Painting.
- B. Section 21 1100 - Facility Fire-Suppression Water-Service Piping.
- C. Section 31 2316.13 - Trenching: Excavating, bedding, and backfilling.
- D. Section 31 2316.13 - Trenching: Excavating, bedding, and backfilling.
- E. Section 09 9000 - Painting and Coating.
- F. Root Creek Water District Standard Specifications

1.03 PRICE AND PAYMENT PROCEDURES

- A. See Section 01 2200 - Unit Prices, for additional unit price requirements.
- B. Pipe and Fittings: By the linear foot. Includes hand trimming excavation, pipe and fittings, bedding, concrete thrust restraints, connection to building service piping, and to municipal utility water source.
- C. Valves: By the unit. Includes valve, fittings and accessories.
- D. Hydrant: By the unit. Includes hand trimming excavation, gravel sump, hydrant, valve, connection, and accessories.
- E. Backflow Preventors: By the unit. Includes all labor and fittings to meet Root Creek Water District (RCWD) Standards. Fire service Backflow Preventor includes integral FDC and swing check valve.

1.04 REFERENCE STANDARDS

- A. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120 2021a.
- B. ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40 2021.

- C. ASTM D2855 - Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets 2020.
- D. AWWA C105/A21.5 - Polyethylene Encasement for Ductile-Iron Pipe Systems 2018.
- E. AWWA C500 - Metal-Seated Gate Valves for Water Supply Service 2019.
- F. AWWA C502 - Dry-Barrel Fire Hydrants 2018.
- G. AWWA C508 - Swing-Check Valves for Waterworks Service, 2-In. Through 48-In. (50-mm Through 1,200-mm) NPS 2017.
- H. AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service 2015.
- I. AWWA C600 - Installation of Ductile-Iron Mains and Their Appurtenances 2017.
- J. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 60 In. (100 mm Through 1,500 mm) 2016, with Errata (2018).
- K. UL 246 - Hydrants for Fire-Protection Service Current Edition, Including All Revisions.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on pipe materials, pipe fittings, valves and accessories.

1.06 QUALITY ASSURANCE

- A. Perform Work in accordance with Root Creek Water District requirements.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store valves in shipping containers with labeling in place.

PART 2 PRODUCTS

2.01 WATER PIPE

- A. Manufacturers:
 - 1. As specified on drawings or by Root Creek Water District.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.
- B. Ductile Iron Pipe: AWWA C151/A21.51:
 - 1. Fittings: Ductile iron, standard thickness.

-
2. Joints: AWWA C111/A21.11, Styrene butadiene rubber (SBR) or vulcanized SBR gasket with rods.
 3. Jackets: AWWA C105/A21.5 polyethylene jacket.
 4. All off-site work and materials shall conform to Root Creek Water District Standards.
- C. PVC Pipe: ASTM D1785 Schedule 40.
1. Fittings: ASTM D2466, PVC.
 2. Joints: ASTM D2855, solvent weld.
 3. Pipe sizes 3 inch and larger which are installed below grade outside the building shall comply with AWWA C-900 Class 235 minimum and ASTM D-2241 rated SDR 21 Class 150. Pipe shall be continually marked with manufacturer's name, pipe size, cell classification, SDR rating, and ASTM classification. Pipe joints shall be integrally molded bell ends in accordance with ASTM D-3034 Table 2 with factory supplies elastomeric gaskets and lubricant.
 4. All off-site work and materials shall conform to Root Creek Water District Standards.
- D. Trace Wire: Magnetic detectable conductor, clear plastic covering, imprinted with "Water Service" in large letters.

2.02 VALVES

- A. Valves: Manufacturer's name and pressure rating marked on valve body.
- B. Gate Valves Up To 3 Inches:
1. Brass or Bronze body, non-rising stem, inside screw, single wedge or disc, compression ends, with control rod, post indicator, valve key, and extension box.
- C. Gate Valves 3 Inches and Over:
1. AWWA C500, iron body, bronze trim, non-rising stem with square nut, single wedge, flanged ends, control rod, post indicator, valve key, and extension box.
 2. AWWA C509, iron body, bronze trim, non-rising stem with square nut, single wedge, resilient seat, flanged ends, control rod, post indicator, valve key, and extension box.
 3. All off-site work and materials shall conform to Root Creek Water District Standards.
- D. Swing Check Valves From 2 Inches to 24 Inches:
1. AWWA C508, iron body, bronze trim, 45 degree swing disc, renewable disc and seat, flanged ends.

E. Backflow Preventors

1. Per Root Creek Water District Standards.

2.03 HYDRANTS

- A. Hydrants: Type as required by Root Creek Water District.
- B. Finish: Primer and two coats of enamel in color required by owner.

2.04 BEDDING AND COVER MATERIALS

- A. Bedding: As specified in Section 31 2316.13 and Root Creek Water District Standards.
- B. Cover: As specified in Section 31 2316.13 and Root Creek Water District Standards.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that building service connection and municipal utility water main size, location, and invert are as indicated.

3.02 TRENCHING

- A. See the sections on excavation and fill for additional requirements.
- B. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.03 INSTALLATION - PIPE

- A. Install ductile iron piping and fittings to AWWA C600.
- B. Route pipe in straight line.
- C. Install pipe to allow for expansion and contraction without stressing pipe or joints.
- D. Slope water pipe and position drains at low points.

3.04 INSTALLATION - VALVES AND HYDRANTS

- A. Set valves on solid bearing.
- B. Center and plumb valve box over valve. Set box cover flush with finished grade.
- C. Set hydrants plumb; locate pumper nozzle perpendicular to and facing roadway in accordance with Section 21 1100.
- D. Set hydrants to grade, with nozzles at least 20 inches above ground in accordance with Section 21 1100.

- E. Install hydrants per Root Creek Water District Standard Drawing W-10.
- F. Paint hydrants in accordance with Section 09 9113.

3.05 SERVICE CONNECTIONS

- A. Provide water service connections in accordance with Root Creek Water District specifications.

3.06 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Perform field inspection and testing in accordance with Section 01 4000.
- C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

END OF SECTION

Section 33 3113
Site Sanitary Sewerage Gravity Piping

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sanitary sewerage drainage piping, fittings, and accessories.
- B. Connection of building sanitary drainage system to municipal sewers.
- C. Cleanout access.
- D. Sand, Silt, and Oil Interceptor.

1.02 RELATED REQUIREMENTS

- A. Section 31 2316 - Excavation: Excavating of trenches.
- B. Section 31 2316.13 - Trenching: Excavating, bedding, and backfilling.
- C. Section 31 2316.13 - Trenching: Excavating, bedding, and backfilling.
- D. Section 33 0561 - Concrete Manholes.
- E. Root Creek Water District Standard Specifications

1.03 PRICE AND PAYMENT PROCEDURES

- A. See Section 01 2200 - Unit Prices, for additional unit price requirements.
- B. Pipe and Fittings:
 - 1. Basis of Measurement: By the linear foot.
 - 2. Basis of Payment: Includes hand trimming excavation, bedding, pipe and fittings, connection to building service piping and to municipal sewer.
- C. Cleanout:
 - 1. Basis of Measurement: By the unit for a nominal depth of 10.
 - 2. Basis of Payment: Includes hand trimming excavating, foundation pad, unit installation with accessories, connection to sewer piping.

1.04 DEFINITIONS

- A. Bedding: Fill placed under, beside and directly over pipe, prior to subsequent backfill operations.

1.05 REFERENCE STANDARDS

- A. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications 2020.
- B. ASTM D2729 - Standard Specification for Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings 2021.

1.06 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating pipe, pipe accessories.

PART 2 PRODUCTS

2.01 SEWER PIPE MATERIALS

- A. Sewer Pipe: as specified on drawings or per Root Creek Water District (RCWD) Standards.
- B. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.

2.02 SAND SILT AND OIL INTERCEPTOR

- A. 1200 Gallon Sand, Silt, and Oil Interceptor Per RCWD Standards.
- B. H-20 Rated.
- C. Includes Interceptor, all accessories, installation, and connection.

2.03 CLEANOUT

- A. Onsite Cleanouts and Risers per RCWD Standards.

2.04 BEDDING AND COVER MATERIALS

- A. Pipe Bedding Material: As specified in Section 31 2316.13.
- B. Pipe Cover Material: As specified in Section 31 2316.13.

PART 3 EXECUTION

3.01 GENERAL

- A. Perform work in accordance with RCWD Standards.

3.02 TRENCHING

- A. See Section 31 2316.13 for additional requirements.

- B. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.03 INSTALLATION - PIPE

- A. Verify that trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on layout drawings. Bedding and backfill per RCWD Standard Details S-1 and S-2.
- B. Install pipe, fittings, and accessories in accordance with manufacturer's instructions. Seal watertight.
 - 1. Plastic Pipe: Also comply with ASTM D2321.
- C. Lay pipe to slope gradients noted on layout drawings; with maximum variation from true slope of 1/8 inch in 10 feet.
- D. Connect to building sanitary sewer outlet, through installed sleeves.

3.04 INSTALLATION - CLEANOUTS

- A. Install Per RCWD Standards.

3.05 INSTALLATION - CLEANOUTS

- A. Form and place cast-in-place concrete base pad, with provision for sanitary sewer pipe end sections.
- B. Establish elevations and pipe inverts for inlets and outlets as indicated.
- C. Mount lid and frame level in grout, secured to top cone section to elevation indicated.

3.06 FIELD QUALITY CONTROL

- A. Perform field inspection and testing in accordance with Section 01 4000.
- B. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

3.07 PROTECTION

- A. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

END OF SECTION

Section 33 4211
Stormwater Gravity Piping

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Stormwater drainage piping.
- B. Stormwater pipe accessories.
- C. Catch basins, Plant area drains, Paved area drainage, Site surface drainage, and Trench Drain.
- D. Automatic Sewer Disconnect Valve.

1.02 RELATED REQUIREMENTS

- A. Section 31 2316.13 - Trenching: Excavating, bedding, and backfilling.
- B. Section 33 0561 - Concrete Manholes.

1.03 PRICE AND PAYMENT PROCEDURES

- A. See Section 01 2200 - Unit Prices, for additional unit price requirements.

1.04 REFERENCE STANDARDS

- A. ASTM C76 - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe 2022a.
- B. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120 2021a.
- C. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications 2020.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating pipe, pipe accessories.
- C. Project Record Documents:
 - 1. Record location of pipe runs, connections, and invert elevations.

PART 2 PRODUCTS

2.01 STORM DRAIN PIPE MATERIALS

- A. PVC storm sewer pipe and fittings shall be SDR 35 and conform to ASTM D3034. Joints shall

conform to ASTM D3212 with gaskets meeting ASTM F447, or as specified in the Civil Drawings.

2.02 PIPE ACCESSORIES

- A. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.

2.03 CATCH BASIN, TRENCH DRAIN, CLEANOUT, AND AREA DRAIN COMPONENTS

- A. Lids and Drain Covers: Cast iron, hinged to cast iron frame.
 - 1. Catch Basin: Per Plans and as directed by Engineer.
 - 2. Area Drain:
 - a. 6 Inch HDPE Drop-in Type or Similar with Linear Grate.
 - b. Compatible with SDR 35 Drain Pipe.
 - c. All fitting, connections, and adaptors to be included.

2.04 BEDDING AND COVER MATERIALS

- A. Bedding: As specified in Section 31 2316.13.
- B. Cover: As specified in Section 31 2316.13.

PART 3 EXECUTION

3.01 TRENCHING

- A. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.02 INSTALLATION

- A. Install pipe, fittings, and accessories in accordance with manufacturer's instructions. Seal watertight.
 - 1. Plastic Pipe: Also comply with ASTM D2321.
- B. Lay pipe to slope gradients noted on layout drawings; with maximum variation from true slope of 1/8 inch in 10 feet.
- C. Connect to building storm drainage system and foundation drainage system.

3.03 FIELD QUALITY CONTROL

- A. Perform field inspection in accordance with Section 01 4000 - Quality Requirements.

3.04 PROTECTION

- A. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

END OF SECTION

Section 33 56 13
Above Ground Fuel-Storage Tanks

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. 1,000-gallon aboveground diesel fuel storage tank with isolated secondary containment system
- B. Pump and trim package for dispensing diesel.
- C. Leak detectors and gauges.
- D. Earthquake restraints.
- E. All other attachments, accessories, components and materials required to provide a complete installation.
- F. Contractor to coordinate with the County and prepare, process, and file a "Spill Prevention Management Plan". Contractor to confirm permitting requirements with the Federal Environmental Protection Agency (EPA) , local Air Pollution Control District and other local agencies and provide all documentation necessary.
- G. Fuel connection package to emergency generator.
- H. Tank access steps

1.02 RELATED REQUIREMENTS

- A. 05 50 00 - Metal Fabrications: Protective bollards
- B. Division 22 Plumbing: Piping to and from generator
- C. Division 26 Electrical
- D. Section 32 13 13 - Concrete Paving

1.03 REFERENCE STANDARDS

- A. NFPA 30 - Flammable and Combustible Liquids Code; 2024, with Errata (2025).
- B. NFPA 780 - Standard for the Installation of Lightning Protection Systems; 2014.
- C. UL 2085 - Protected Aboveground Tanks for Flammable and Combustible Liquids; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. Product Data – Submit material specifications, manufacturer’s installation, and maintenance instructions under provisions of section 013300 - Submittals.
- B. Shop drawings: Indicate system components, size of components, location, and provide full schematic or wiring system showing layout and operations details.
- C. Submit manufacturer’s descriptive literature, operating instructions and maintenance and repair data under provisions of Section 017700 - Contract Closeout.
- D. Manufacturer to submit on completion of system verification a point-by-point check list indicating the date and time of each item inspected and issue a certificate, under provisions of Section 014300 - Quality Requirements, confirming that the inspection has been completed and the system is installed and functioning in accordance with the specifications.

1.05 QUALITY ASSURANCE

- A. Installer – The fuel storage tank system installer shall be currently approved by the manufacturer, and have experience of at least 5 years installing the selected system.
- B. Installation subject to approved shop drawings, inspection, and testing.
- C. Manufacturer will have a minimum of five (5) years of experience in producing specified tank for commercial use and document at least ten (10) installations in satisfactory operation.
- D. The manufacturer must stipulate no AST containment system failure in 24,000 units produced.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protection
 - 1. Aboveground fuel storage system to be stored at the job site in a safe place with all labels intact and legible at time of installation.
 - 2. Use all means to protect aboveground fuel storage system before, during, and after installation. Do not allow products to become wet or damp.
- B. Replacements – In the event of damage, including water intrusion, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

1.07 WARRANTY

- A. Thirty-year (30-year) warranty on aboveground fuel storage tank system.
- B. One-year (1-year) warranty of parts, work quality, and installation.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Manufacturer: All the materials listed in this section are based on the products of ConVault (Oldcastle: oldcastleinfrastructure.com) as a standard of quality.
- B. County has established a standard for above ground fuel tanks and no substitutions will be accepted.

2.02 ABOVE GROUND FUEL STORAGE TANK

- A. Description: Provide the ConVault Aboveground Tank System, which carries listing and label under UL Standard 2085, INSULATED Secondary Containment Aboveground Tank for Flammable and Combustible Liquids, Protected Type with Vehicle Impact and Projectile Resistance. The Tank System will provide Emergency Venting for Secondary Containment by Form-of-Construction. Unit must comply with all provisions of U.F.C. 79-7, Appendix (A-II-F). The Tank System and its enclosure shall be a completed unit at the factory (shop fabricated). The Tank System shall be approved for Phase I and Phase II Vapor Recovery by the California Air Resources Board for gasoline and methanol.
- B. Capacity: 1,000 gallons.
 - 1. Size: 11'-0" long x 5'-8" wide x 4'-4" high
 - 2. Empty Weight: 18,000 lbs.
- C. Diesel Pump and Dispensing package: FR702VRU as manufactured by Fill-Rite Systems: www.fillrite.com as basis of design.
 - 1. Pump Package
 - a. Power: 115 volts AC
 - b. Pump Rating: 1/3 HP
 - c. Duty Cycle: 30 minutes
 - d. Pump type: Rotary vane
 - e. Max head: 53 feet
 - f. Flow rate: 15 GPM with nozzle
 - g. Hose: 20 feet in length.
 - h. Nozzle: 3/4 inch
 - 2. Remote Pedestal: FR102PHU
 - a. Remote pump switch
 - b. Security solenoid
 - c. Standard nozzle boot
 - d. 45 degree swivel
 - e. Powder coated steel cabinet
 - f. Water absorption and particulate removal filter, 30 micron
 - 1) Provide 5 spare filters
 - 3. Hose Retractor, based on OPW: www.opwglobal.com, as Basis of Design
 - a. Post 78" tall
 - b. Heavy duty retractor box
 - 1) 12-20 lb retraction strength
 - c. Hose clamp: Size as required to fit dispenser hose

- D. The primary steel tank shall be rectangular in shape and have continuous welds on all exterior seams, manufactured in accordance with UL listing requirements and UL 142.
- E. The primary steel tank shall be pressure tested at 5 psig for 24 hours.
- F. The primary steel tanks shall have "emergency vent" system as per NFPA 30 Code requirements.
- G. The protected and insulated AST systems shall have a thru-tank leak detector tube to allow for physical checkup and monitoring capability between the primary and the secondary containment.
- H. The primary steel tank shall be pressurized at 5 psig during concrete encasement.
- I. The outer surface of the primary steel tank shall be covered by a minimum of 1/4" thick (6.4 mm) Styrofoam insulation panels or equally acceptable thermal insulation.
- J. The secondary containment shall consist of a 30 Mil thick (0.76 mm) High-Density Polyethylene membrane enclosing the steel tank and insulation material.
- K. The primary steel tank and the secondary containment shall be encased in six (6) inches of monolithic reinforced concrete, with minimum design strength of 4,000 and 5,000 psi at 28 days depending on the tank size. The concrete design shall include the following for long-term durability: air entrainment, water reducing admixture, and steel reinforcement. Concrete encasements with seams will not be approved.
- L. The protected and insulated AST systems shall be of concrete exterior and a continuous and visually verifiable monolithic (seamless) pour on top, bottom, ends, and sides and contain no cold joints or heat sinks (heat transfer points). The AST must be shop fabricated and tested in accordance with the UL listings. Designs that use two layers of steel with insulation material between them will not be approved.
- M. No steel or insulating material shall come in contact with the concrete or other corrosive material.
- N. All openings shall be from the top only.
- O. All exposed metal must be powder coated to inhibit corrosion.
- P. The protected and insulated AST systems shall include a minimum 5-15 gallon powder coated UL listed integral spill containment, and shall include normally closed valve to release spilled product into the primary steel tank. Spill containment which route the spilled product into interstitial area will not be approved.
- Q. The protected and insulated AST systems shall have a coated concrete exterior to resist weather and reflect sunlight. Models with steel exteriors will not be approved.
- R. The protected and insulated AST systems shall have two (2) lugs for connecting grounding conductors for lightning protection in accordance with NFPA 780.

- S. Fire Resistance: The Tank System shall be designed and tested to provide 2-hour fire protection for the primary tank as per UL 2085 2-hour furnace fire test and 2-hour simulated pool fire test. No steel members shall penetrate the walls or floor of the concrete encasement to assure isolation from pool fire heat.
- T. Bullet Resistance: The primary tank must withstand the U.L./U.F.C. test for ballistics impact of 5 bullets within 9 square feet. The bullets will be 150 grain, M2 balls of ammunition fired at a muzzle velocity of 2,700 feet/second from 100 yards. The primary tank is then pressure tested at 5 psi air pressure to check for leakage.
- U. Vehicle Impact Resistance: Unit must withstand the U.L./U.F.C. test for impact resistance. The impact will be 12,000 pounds at 10 mph with the load applied over 1 square foot. Following the impact, the primary tank is then pressure tested to check for leakage.
- V. Thermal and Corrosion Protection: The Tank System construction shall include thermal insulation equivalent to .25 inches of polystyrene to protect against temperature extremes, and to protect against corrosion by isolating the steel tank from the concrete or other corrosive material. All steel exterior to the concrete encasement shall be antioxidant powder coated to inhibit corrosion and meet ASTM B117.
- W. Secondary Containment with Leak Monitoring: Unit construction must provide Emergency Venting for Secondary Containment by Form-of-Construction according to UL Standard 2085 which meets testing criteria. The Tank System shall include an impervious barrier of 30-mil high-density polyethylene to contain leaks from the primary tank. The secondary containment shall be inside of the bullet and vehicle impact material.
- X. Spill / Overfill Containment: The Tank System shall include a UL listed 7-gallon spill/overfill container manufactured as an integral part of the primary tank, surrounding the fill pipe, and protected by the 2-hour fire rating of the enclosure. The spill/overfill container shall include a stick port and normally closed valve to release spilled product into the main tank. Exterior steel shall be antioxidant powder coated to inhibit rust.
- Y. Overfill Protection: Overfill protection shall be provided by the following methods:
 - 1. Direct reading level gauge visible from fill pipe access;
 - 2. Audible / visual high-level alarm.
- Z. Exterior Finish: The tank's concrete exterior surface shall be finished with off-white STO or Perma-Crete exterior coating system (to be determined by Architect).
- AA. Signage: Tanks shall be marked per state and local codes. Signs will be recessed in concrete exterior to insure against damage during off-loading, refilling, or general functions.
- BB. Venting: Tank system shall include a 2-inch atmospheric vent and emergency venting in accordance with NFPA 30.
- CC. Anti-Spill Valves: The valve shall be an approved anti-siphon valve or electric solenoid valve.
- DD. Connection of Emergency Generator to Fuel Tank: Contrator shall provide and install all connections required for a complete system to connect the emergency generator to the above ground fuel tank including: termination connection to emergency generator, termination

connection to the above ground fuel tank, anti siphon valve, expansion relief, a ball shut off valve at each pipe, and all piping, connections and support required for a complete system.

2.03 TANK ACCESS STEPS

- A. Platform steps with handrail
 - 1. Platform step shall be compliant with Cal-OSHA requirements
 - 2. Platform
 - a. Material: Aluminum
 - b. Tread: Perforated
 - c. Width: 36 inches minimum
 - d. Depth: 48 inches minimum
 - 3. Steps
 - a. Material: Aluminum
 - b. Tread: Perforated
 - c. Rise: 7 inches max
 - d. Tread depth: 12 inches
 - 4. Legs
 - a. Material: Galvanized steel
 - b. Adjustment range: 9 inches minimum
 - c. Foot pads: Polyethylene Plastic
 - 5. Handrails/Guardrails
 - a. Material: Galvanized steel
 - b. Guardrail height: 42 inches
 - c. Handrail height: 36 inches
 - 6. Manufacturer
 - a. Tri Arc: TAVSC34-AS: tri-arc.com (Basis of Design)
 - b. Or equal

2.04 EARTHQUAKE RESTRAINTS

- A. Provide restraints to attach tank to foundation at each end of each storage tank foot per manufacturers recommendation to comply with all code and local jurisdiction requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Inspection
 - 1. Prior to installation of the 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.
 - 2. Verify that aboveground fuel storage tank system may be installed in accordance with the approved design.
- 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. Fabrication – General: Field verify all dimensions prior to fabrication.

3.02 INSTALLATION

- A. The tank system including accessories shall be installed in strict accordance with the manufacturer's recommendations and applicable fire and environmental codes. Contractor prior to installation shall obtain all state and local permits.
- B. Tanks shall be installed on a reinforced concrete base slab designed to support the fully loaded tank. Protective guard posts shall be installed where required by state and local codes.
- C. Tanks shall be marked with warning signs: "FLAMMABLE" or "COMBUSTIBLE", or "NO SMOKING", product identification, and other signs as required by applicable codes.
- D. Electrical work shall be in accordance with applicable codes and shall be rated for hazardous area as required. Electric fee for dispensing pumps shall include an emergency shutoff switch located per code requirements. Tanks shall be electrically grounded in accordance with NFPA 780

End of Section