

PROJECT MANUAL

CONTRACTUAL – LEGAL REQUIREMENTS
TECHNICAL SPECIFICATIONS

FOR

**HVAC IMPROVEMENTS AT
MADERA HIGH SCHOOL**

NPCE Project No.: 1336

District Bid No.: --

DSA File No.: 20-H3

DSA Appl. No.: 02-122084

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT

APP: 02-122084 INC:

REVIEWED FOR

SS ☒

FLS ☒

ACS ☐

DATE: 07/03/2024

DSA APP NO. 02-122084

SECTION 000107

SEALS PAGE



A handwritten signature in black ink, likely belonging to Aya Shitanishi.

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END OF SECTION

MADERA UNIFIED SCHOOL DISTRICT

DOCUMENT 00100

INFORMATION FOR BIDDERS

1. AVAILABILITY OF CONTRACT DOCUMENTS

Bids must be submitted to the District on the Bid Forms which are a part of the Bid Package for the Project. Contract Documents may be obtained from the District at the location(s) and at the time(s) indicated in the Notice Inviting Bids. Prospective bidders are encouraged to telephone in advance to determine the availability of Contract Documents. Any applicable charges for the Contract Documents are outlined in the Notice Inviting Bids.

As required by Public Contract Code Section 20103.7, the District shall also make an electronic version of the Contract Documents available for review at one or more plan rooms, as indicated in the Notice Inviting Bids. Please Note: Prospective bidders who choose to review the Contract Documents at a plan room must contact the District to obtain the required Contract Documents if they decide to submit a bid for the Project.

2. EXAMINATION OF CONTRACT DOCUMENTS

The District has made copies of the Contract Documents available, as indicated above. Bidders shall be solely responsible, at its own expense and prior to submitting its bid, for examining the Project Site and the Contract Documents, including any Addenda issued during the bidding period, and for informing itself with respect to local labor availability, means of transportation, necessity for security, laws and codes, local permit requirements, wage scales, local tax structure, contractors' licensing requirements, availability of required insurance, and other factors that could affect the Work. Bidders are responsible for consulting the standards referenced in the Contract. Failure of Bidder to receive and so examine and inform itself shall be at its sole risk, and no relief for error or omission will be given except as required under State law.

3. INTERPRETATION OF CONTRACT DOCUMENTS

Discrepancies in, and/or omissions from the Plans, Specifications or other Contract Documents or questions as to their meaning shall be immediately brought to the attention of the District by submission of a written request for an interpretation or correction to the District via **Susan Harautuneian**. Such submission, if any, must be sent **Susan Harautuneian** by emailing to **susanharautuneian@maderausd.org**. The person submitting the request for interpretation or correction is responsible for its prompt delivery. The final date for submittal of requests for interpretation or correction, if any, shall be specified in the Notice Inviting Bids.

Any interpretation of the Contract Documents will be made only by written addenda duly issued and mailed or delivered to each person or firm who has purchased a set of Contract Documents. The District will not be responsible for any explanations or interpretations provided in any other

manner. No person is authorized to make any oral interpretation of any provision in the Contract Documents to any bidder, and no bidder should rely on any such oral interpretation.

Bids shall include complete compensation for all items that are noted in the Contract Documents as the responsibility of the Contractor.

4. INSPECTION OF SITE; PRE-BID CONFERENCE AND SITE WALK

Each prospective bidder is responsible at its own expense for fully acquainting itself with the conditions of the Project Site (which may include more than one site), as well as those relating to the construction and labor of the Project, to fully understand the facilities, difficulties and restrictions which may impact the cost or effort required to complete the Project. To this end, a Pre-Bid Conference and Site Walk will be held on the date(s) and time(s) indicated in the Notice Inviting Bids. ***Bids will not be accepted from any bidder who did not attend the mandatory job walk. Bidders will be required to sign the attendance sheet at the mandatory job walk. Only bidders attending the job walk and signing in will receive any addenda that are issued.*** Storm, surface, nuisance, or other waters may be encountered at various times during construction of the Project. Federal and State laws require the District and its contractors to appropriately manage such waters pursuant to the requirements of California State Water Resources Control Board Order Number 2009-0009-DWQ, the Federal Clean Water Act, and the California Porter Cologne Water Quality Control Act. By submitting a Bid, each bidder acknowledges that it has investigated the risk arising from such waters, has prepared its Bid accordingly, and assumes any and all risks and liabilities arising therefrom.

5. ADDENDA

The District reserves the right to revise the Contract Documents prior to the bid opening date. Revisions, if any, shall be made by written Addenda. All addenda issued by the District shall be included in the bid and made part of the Contract Documents. Pursuant to Public Contract Code Section 4104.5, if the District issues an Addendum which includes material changes to the Project less than 72 hours prior to the deadline for submission of bids, the District will extend the deadline for submission of bids. The District may determine, in its sole discretion, whether an Addendum warrants postponement of the bid submission date. Each prospective bidder shall provide District a name, address and facsimile number to which Addenda may be sent, as well as a telephone number by which the District can contact the bidder. Copies of Addenda will be furnished by facsimile, first class mail, express mail or other proper means of delivery without charge to all parties who have obtained a copy of the Contract Documents and provided such current information. Please Note: Bidders are responsible for ensuring that they have received any and all Addenda. Each bidder's bid form shall acknowledge receipt, understanding and full consideration of all Addenda. To this end, each bidder should contact the District to verify that he has received all Addenda issued, if any, prior to the bid opening. Failure to acknowledge receipt of all Addenda may result in rejection of the bid

6. ALTERNATE BIDS

If alternate bid items are called for in the Contract Documents, the lowest bid will be determined on the basis of the base bid only, unless otherwise specified in the Notice Inviting Bids. However, the District may choose to award the contract on the basis of the base bid alone or the base bid and any alternate or combination of alternates. The time required for completion of the alternate bid items has been factored into the Contract duration and no additional Contract time will be awarded for any of the alternate bid items. The District may elect to include one or more of the alternate bid items, or to otherwise remove certain work from the Project scope of work, accordingly each Bidder must ensure that each bid item contains a proportionate share of profit, overhead and other costs or expenses which will be incurred by the Bidder. All alternates affecting DSA regulated items to be fully detailed on approved plans.

7. COMPLETION OF BID FORMS

Bids shall only be prepared using copies of the Bid Forms which are included in the Contract Documents. The use of substitute bid forms other than clear and correct photocopies of those provided by the District will not be permitted. Bids shall be executed by an authorized signatory as described in these Information for Bidders. In addition, Bidders shall fill in all blank spaces (including inserting "N/A" where applicable) and initial all interlineations, alterations, or erasures to the Bid Forms. Bidders shall neither delete, modify, nor supplement the printed matter on the Bid Forms nor make substitutions thereon. **USE OF BLACK OR BLUE INK, INDELIBLE PENCIL OR A TYPEWRITER IS REQUIRED.** Deviations in the bid form may result in the bid being deemed non-responsive. Bidders should not deface or mutilate the bid documents to the extent that they may not be usable for construction purposes.

8. MODIFICATIONS OF BIDS

Each Bidder shall submit its Bid in strict conformity with the requirements of the Contract Documents. Unauthorized additions, modifications, revisions, conditions, limitations, exclusions or provisions attached to a Bid may render it non-responsive and may cause its rejection. Bidders shall neither delete, modify, nor supplement the printed matter on the Bid Forms, nor make substitutions thereon. Oral, telephonic and electronic modifications will not be considered, unless the Notice Inviting Bids authorizes the submission of electronic bids and modifications thereto and such modifications are made in accordance with the Notice Inviting Bids.

9. DESIGNATION OF SUBCONTRACTORS

Pursuant to State law, the Bidders must designate on the form provided herein, and submit with their Bid, the name, license number, DIR registration number, and location of each subcontractor who will perform work or render services for the Bidder in an amount that exceeds one-half of one percent (1/2%) of the Bidder's Total Bid Price, as well as the portion of work each such subcontractor will perform on the form provided herein by the District. If requested by the District, Bidders are required to submit the phone number, license expiration date, and any other requested information for each subcontractor listed in its bid within twenty-four (24) hours of bid opening.

10. ANTI-DISCRIMINATION.

It is the policy of the District 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.

11. LICENSING REQUIREMENTS

Pursuant to Section 7028.15 of the Business and Professions Code and Section 3300 of the Public Contract Code, all bidders must possess proper licenses for performance of this Contract at the time of submission of their bid, and must maintain the licenses throughout the duration of the Contract. Subcontractors must possess the appropriate licenses for each specialty subcontracted, including but not limited to all certifications required by the United States Environmental Protection Agency Lead Renovation, Repair, and Paint Rule set forth at Title 40, Part 745 of the Code of Federal Regulations. Pursuant to Section 7028.5 of the Business and Professions Code, the District shall consider any bid submitted by a contractor not currently licensed in accordance with state law and pursuant to the requirements found in the Contract Documents to be non-responsive, and the District shall reject the Bid. The District shall have the right to request, and Bidders shall provide within five (5) calendar days, evidence satisfactory to the District of all valid license(s) currently held by that Bidder and each of the Bidder's subcontractors, before awarding the Contract. Failure of a bidder to obtain proper and adequate licensing for an award of a contract shall constitute a failure to execute the contract and may result in forfeiture of the bidder's bid security.

12. SIGNING OF BIDS

All Bids submitted shall be executed by the Bidder or its authorized representative. Bidders may be asked to provide evidence in the form of an authenticated resolution of its Board of Directors or a Power of Attorney evidencing the capacity of the person signing the Bid to bind the Bidder to each Bid and to any Contract arising therefrom.

If a Bidder is a joint venture or partnership, it may be asked to submit an authenticated Power of Attorney executed by each joint venturer or partner appointing and designating one of the joint venturers or partners as a management sponsor to execute the Bid on behalf of Bidder. Only that joint venturer or partner shall execute the Bid. The Power of Attorney shall also: (1) authorize that particular joint venturer or partner to act for and bind Bidder in all matters relating to the Bid; and (2) provide that each venturer or partner shall be jointly and severally liable for any and all of the duties and obligations of Bidder assumed under the Bid and under any Contract arising therefrom. The Bid shall be executed by the designated joint venturer or partner on behalf of the joint venture or partnership in its legal name.

13. BID SECURITY

Each bid shall be accompanied by: (a) cash; (b) a certified check made payable to the District; (c) a cashier's check made payable to the District; or (d) a bid bond payable to the District executed by the bidder as principal and surety as obligor in an amount not less than 10% of the maximum amount of the bid. Personal sureties and unregistered surety companies are unacceptable. The surety insurer shall be California admitted surety insurer, as defined in Code of Civil Procedure Section 995.120. 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, shall provide the payment and performance bonds and insurance certificates and endorsements as required herein within ten (10) calendar days after notification of the award of the Contract to the bidder. Failure to provide the required documents may result in forfeiture of the bidder's bid deposit or bond to the District and the District may award the Contract to the next lowest responsible bidder, or may call for new bids.

14. SUBMISSION OF SEALED BIDS

Once the Bid and supporting documents have been completed and signed as set forth herein, they shall be placed, along with the Bid Guarantee and other required materials in an envelope, sealed, addressed and delivered or mailed, postage prepaid to the District at the place and to the attention of the person indicated in the Notice Inviting Bids. No oral or telephonic bids will be considered. No forms transmitted via the internet, e-mail, facsimile, or any other electronic means will be considered unless specifically authorized by District as provided herein. The envelope shall also contain the following in the lower left-hand corner thereof:

Bid of _____ (Bidder's Name)
for the Bid No.

Only where expressly permitted in the Notice Inviting Bids, may Bidders submit their bids via electronic transmission pursuant to Public Contract Code Sections 1600 and 1601. The acceptable method(s) of electronic transmission shall be stated in the Notice Inviting Bids. District reserves the right to refuse to accept electronically transmitted bids where not specifically authorized in the Notice Inviting Bids, and may reject any bid not strictly complying with District's designated methods for delivery.

15. DELIVERY AND OPENING OF BIDS

Bids will be received by the District at the address shown in the Notice Inviting Bids up to the date and time shown therein. The District will leave unopened any Bid received after the specified date and time, and any such unopened Bid will be returned to the Bidder. It is the Bidder's sole responsibility to ensure that its Bid is received as specified. Bids may be submitted earlier than the dates(s) and time(s) indicated. Bidders are advised that on bid date District telephones WILL NOT be available for use by bidders or their representatives.

Bids will be opened at the date and time stated in the Notice Inviting Bids, and the amount of each Bid will be read aloud and recorded. All Bidders may, if they desire, attend the opening of Bids. The District may in its sole discretion, elect to postpone the opening of the submitted Bids.

District reserves the right to reject any or all Bids and to waive any informality or irregularity in any Bid. In the event of a discrepancy between the written amount of the Bid Price and the numerical amount of the Bid Price, the written amount shall govern.

16. WITHDRAWAL OF BID

Prior to bid opening, a Bid may be withdrawn by the Bidder only by means of a written request signed by the Bidder or its properly authorized representative. Any request to withdraw a bid after bid opening shall be submitted in writing and in accordance with all requirements of Public Contract Code Section 5100 et seq.

17. BASIS OF AWARD; BALANCED BIDS

The District shall award the Contract to the lowest responsible Bidder submitting a responsive Bid. The District may reject any Bid which, in its opinion when compared to other bids received or to the District's internal estimates, does not accurately reflect the cost to perform the Work. The District may reject as non-responsive any bid which unevenly weights or allocates costs, including but not limited to overhead and profit to one or more particular bid items.

18. DISQUALIFICATION OF BIDDERS; INTEREST IN MORE THAN ONE BID

No bidder shall be allowed to make, submit or be interested in more than one bid. However, a person, firm, corporation or other entity that has submitted a subproposal to a bidder, or that has quoted prices of materials to a bidder, is not thereby disqualified from submitting a subproposal or quoting prices to other bidders submitting a bid to the District. No person, firm, corporation, or other entity may submit subproposal to a bidder, or quote prices of materials to a bidder, when also submitting a prime bid on the same Project.

19. INSURANCE REQUIREMENTS

Prior to commencement of any work under the Contract, the successful bidder shall procure the insurance in the form and in the amount specified in the Contract Documents, from insurers meeting all requirements specified therein.

20. AWARD PROCESS

Once all Bids are opened and reviewed to determine the lowest responsive and responsible Bidder, the District's governing Board may award the contract. The apparent successful Bidder should begin to prepare the following documents: (1) the Performance Bond; (2) the Payment Bond; and (3) the required insurance certificates and endorsements. Once the District notifies the Bidder of the award, the Bidder will have ten (10) consecutive calendar days from the date of this notification to execute the Contract and supply the District with all of the required documents and certifications. In the event the bidder fails or refuses to post the required bonds, return executed copies of the Contract within ten (10) consecutive calendar days, the District 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. Alternatively, the District may in its sole discretion extend the time for the bidder to provide the required documents and certifications, however, regardless whether the Bidder supplies the required documents and certifications in a timely manner, the Contract time will begin to run ten (10) calendar days from the date of the notification. Once the District receives all of the properly drafted and executed documents and certifications from the Bidder, the District shall issue a Notice to Proceed to that Bidder.

21. CONTRACT PROCEDURES

The District will give the successful bidder a notice of award of Contract. 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

22. FILING OF BID PROTESTS

Submitted bids will be timely made available for review upon request of any bidder. Bidders may file a “protest” of a Bid with the District’s Director of Purchasing. In order for a Bidder’s protest to be considered valid, the protest must:

- A. Be filed in writing within five (5) calendar days after the bid opening date;
- B. Clearly identify the specific irregularity or accusation;
- C. Clearly identify the specific District staff determination or recommendation being protested;
- D. Specify, in detail, the grounds of the protest and the facts supporting the protest; and
- E. Include all relevant, supporting documentation with the protest at time of filing.

If the protest does not comply with each of these requirements, it may be rejected without further review.

If the protest is timely and complies with the above requirements, the District’s Director of Purchasing, or other designated District staff member, shall review the basis of the protest and all relevant information. The District will provide a written response to the protestor.

23. CONTACT WITH DISTRICT PERSONNEL.

IN ORDER TO CONTROL INFORMATION DISSEMINATED REGARDING THIS BID, ORGANIZATIONS INTERESTED IN SUBMITTING PROPOSALS ARE DIRECTED NOT TO MAKE PERSONAL CONTACT WITH DISTRICT EMPLOYEES OR BOARD MEMBERS. QUESTIONS REGARDING THIS BID MAY BE SUBMITTED IN WRITING TO: SUSAN HARAUTUNEIAN AT SUSANHARAUTUNEIAN@MADERAUSD.ORG

24. WORKERS COMPENSATION

Each Bidder shall submit the Contractors Certificate Regarding Workers' Compensation form.

25. PUBLIC WORKS CONTRACTOR REGISTRATION CERTIFICATION

Pursuant to Labor Code sections 1725.5 and 1771.1, all contractors and subcontractors that wish to bid on, be listed in a bid proposal, or enter into a contract to perform public work must be registered with the Department of Industrial Relations. No bid will be accepted nor any contract entered into without proof of the contractor's and subcontractors' current registration with the Department of Industrial Relations to perform public work. If awarded a Contract, the Bidder and its subcontractors, of any tier, shall maintain active registration with the Department of Industrial Relations for the duration of the Project. To this end, Bidder shall sign and submit with its Bid the Public Works Contractor Registration Certification on the form provided, attesting to the facts contained therein. Failure to submit this form may render the Bid non-responsive. In addition, each Bidder shall provide the registration number for each listed subcontractor in the space provided in the Designation of Subcontractors Form.

26. SUBSTITUTION OF SECURITY

The Contract Documents call for monthly progress payments based upon the percentage of the work completed. Unless otherwise specified in the Notice Inviting Bids, the District will retain five percent (5%) of each progress payment as provided by the Contract Documents. At the request and expense of the successful Bidder, the District will substitute securities for the amount so retained in accordance with Public Contract Code Section 22300.

27. PREVAILING WAGES

The District 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 may be obtained online at <http://www.dir.ca.gov/dlsr> or will be made available by the District upon request. Bidders are advised that a copy of these rates must be posted by the successful Bidder at the job site(s).

28. 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 to a debarred subcontractor by the Contractor for the Project shall be returned to the District. 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.

29. PERFORMANCE BOND AND PAYMENT BOND REQUIREMENTS

Within the time specified in the Contract Documents, the Bidder to whom a Contract is awarded shall deliver to the District four identical counterparts of the Performance Bond and Payment Bond in the form supplied by the District and included in the Contract Documents, which form should be carefully examined by the bidder. Failure to do so may, in the sole discretion of District, result in the forfeiture of the Bid Guarantee. The surety supplying the bond must be an admitted surety insurer, as defined in Code of Civil Procedure Section 995.120, authorized to do business as such in the State of California and satisfactory to the District. The Performance Bond and the Payment Bond shall be for one hundred percent (100%) of the Total Bid Price.

30. REQUEST FOR SUBSTITUTIONS

The successful bidder shall comply with the substitution request provisions set forth in the General Conditions and/or Special Conditions, including any deadlines for substitution requests which may occur prior to the bid opening date.

31. SALES AND OTHER APPLICABLE TAXES, PERMITS, LICENSES AND FEES

Contractor and its subcontractors performing work under this Contract will be required to pay California sales tax and other applicable taxes, and to pay for permits, licenses and fees required by the agencies with authority in the jurisdiction in which the work will be located, unless otherwise expressly provided by the Contract Documents.

32. EXECUTION OF CONTRACT

As required herein the Bidder to whom an award is made shall execute the Contract in the form included in the Contract Documents, which should be carefully examined by the bidder. The District may require appropriate evidence that the persons executing the Contract are duly empowered to do so.

33. REQUIRED CERTIFICATIONS

Bidders, for all projects involving state funds, are required to submit the “Asbestos-Free Materials Certification.” This form is included in this package and must be signed under the penalty of perjury and dated, and shall be submitted to the District in accordance with Section 83 of the General Conditions. The successful bidder shall also execute, under the penalty of perjury and dated, the “Recycled Content Certification” and the “Drug-Free Workplace Certification” included in this package.

Further, by law it is the District’s responsibility to determine whether a contractor must provide fingerprint certification. Pursuant to Education Code section 45125.2, the District considers the totality of the circumstances in order to determine if fingerprinting of employees of a contractor working on a school site is required. Factors to be considered include the length of time the contractor’s employees are on school grounds, whether students are in proximity with the location where the contractor’s employees are working, and whether the contractor’s employees are working alone or with others. A determination regarding whether fingerprint certification is required is contained in the Special Conditions. These forms are included with the bid package and must be signed under the penalty of perjury and dated. The successful bidders shall also be required to hold additional certifications required by the Work, before engaging in the Work. Such certifications may include but are not limited to all certifications required by the United States Environmental Protection Agency Lead Renovation, Repair, and Paint Rule set forth at Title 40, Part 745 of the Code of Federal Regulations. In addition to the above, each bidder shall submit the certification required by the Iran Contracting Act of 2010, Public Contract Code Section 2200 et seq. as provided with the Contract Documents.

34. BID DEPOSIT RETURN.

The District will return the security accompanying the bids of all unsuccessful bidders, except as otherwise provided herein, no later than sixty (60) calendar days after award of the Contract.

END OF INFORMATION FOR BIDDERS

DOCUMENT 00200
PRIME POINT OF CONTACT

BID No.

Each proponent's proposal must contain a statement indicating the name of their prime point of contact for the resolution of difficulties with the vendor's proposed offerings.

Name of Company

Address

Signature
Code

City State Zip

Print Name
Fax Number

Phone Number

Title

Email Address

Bid No.

DOCUMENT 00300
BID FORM

NAME OF BIDDER: _____

The undersigned, hereby declare that we have carefully examined the location of the proposed Work, and have read and examined the Contract Documents, including all plans, specifications, and all addenda, if any, for the following Project:

Bid No.

We hereby propose to furnish all labor, materials, equipment, tools, transportation, and services, and to discharge all duties and obligations necessary and required to perform and complete the Project in a good and workmanlike manner within the time stipulated for the following TOTAL BID PRICE:

	BID PRICE (IN WRITTEN FORM)	BID PRICE (IN NUMBERS)
BASE BID		
ALLOWANCE	Eight Thousand, six-hundred forty dollars and zero cents	xxxxxxx
TOTAL BID PRICE		

In case of discrepancy between the written price and the numerical price, the written price shall prevail.

If the Contract Documents specify alternate bid items, the following Alternate Bid amounts shall be added to or deducted from the Total Bid Price entered above (please check the appropriate box), at the District's sole option. The District can choose to include one or more of the Alternate Bids in the Project. If any of the Alternate Bids are selected by the District, the resulting amount shall be added to or deducted from Total Bid Price for the Project. The District may select one or more of the Alternate Bids at the below stated Bid Price up to sixty (60) days following award of the Contract. The District can award/select Alternate Bid items at any time(s).

ALTERNATE BIDS	BID PRICE (IN WRITTEN FORM)	BID PRICE (IN NUMBERS)
ALTERNATE #2 <input type="checkbox"/> Add <input type="checkbox"/> Deduct		
ALTERNATE #3 <input type="checkbox"/> Add <input type="checkbox"/> Deduct		
ALTERNATE #4 <input type="checkbox"/> Add <input type="checkbox"/> Deduct		
ALTERNATE #5 <input type="checkbox"/> Add <input type="checkbox"/> Deduct		
ALTERNATE #6 <input type="checkbox"/> Add <input type="checkbox"/> Deduct		

The undersigned agrees that this Bid Form constitutes a firm offer to the District which cannot be withdrawn for the number of calendar days indicated in the Notice Inviting Bids from and after the bid opening, or until a Contract for the Work is fully executed by the District and a third party, whichever is earlier.

The Contract duration shall commence on the date stated in the District's Notice to Proceed, and shall be completed by the Contractor in the time specified in the Contract Documents. In no case shall the Contractor commence construction prior to the date stated in the District's Notice to Proceed.

Bidder certifies that it 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.

Notice of acceptance or requests for additional information provided by the District should be addressed to the undersigned at the address stated below:

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 co-partnership, 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.)

The undersigned acknowledges receipt, understanding and full consideration of the following addenda to the Contract Documents.

Addenda No. _____

Addenda No. _____

Addenda No. _____

1. Attached is the completed Prime Point of Contact Form
2. Attached is the completed Contractor's Certificate Regarding Workers' Compensation form.
3. Attached is the required bid security in the amount of not less than 10% of the Total Bid Price.
4. Attached is the completed Designation of Subcontractors form.
5. Attached is the completed Designation of DVBE Subcontractors form
6. Attached is the completed Project Listings
7. Attached is the completed Asbestos-Free Materials Certification form, if required.
8. Attached is the completed Recycled Content Certification form.
9. Attached is the completed Contractor and Subcontractor Fingerprint Certification forms, if required.
10. Attached is the completed Drug-Free Workplace Certification form.
11. Attached is the completed Alcoholic Beverage and Tobacco Free Workplace Policy form.
12. Attached is the completed Public Works Contractor Registration Certification form.
13. Attached is the fully executed Non-Collusion Declaration form.
14. Attached is the fully completed Iran Contracting Act form
15. Attached is the completed Executive Order N-6-22

Pursuant to Section 7103.5 of the Public Contract Code submitting a bid to the District, the bidder offers and agrees that if the bid is accepted, it will assign to District 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.

I hereby certify under penalty of perjury under the laws of the State of California, that all of the information submitted in connection with this Bid and all of the representations made herein are true and correct.

Name of Bidder _____

Signature _____

Name and Title _____

Dated _____

NOTE: If bidder is a corporation, the legal name of the corporation shall be set forth above together with the signatures of authorized officers or agents and the document shall bear the corporate seal; if bidder is a partnership, the true name of the firm shall be set forth above together with the signature of the partner or partners authorized to sign contracts on behalf of the partnership; and if bidder is an individual, his or her signature shall be placed above.

Business Address: _____

Place of Residence: _____

Telephone: (____) _____

DOCUMENT 00400
**CONTRACTOR'S CERTIFICATE REGARDING
WORKERS' COMPENSATION**

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.

Name of Bidder _____

Signature _____

Name _____

Title _____

Dated _____

DOCUMENT 00410

BID BOND

KNOW ALL MEN BY THESE PRESENTS: THAT we, _____, as Principal, and _____, as Surety, are held and firmly bound unto the Madera Unified School District, hereinafter called the District, in the penal sum of _____ PERCENT (_____%) OF THE TOTAL AMOUNT OF THE BID of the Principal submitted to the said DISTRICT 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. 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 therefor, or if no period be specified, within ten (10) consecutive calendar days after the Award of Contract (which date shall be the day following the governing board approval of the award) complete the prescribed forms are presented to him for signature enter into a written contract with the District 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 District the difference between the amount specified in said bid and the amount for which the District 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 District 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.

SAMPLE: BID BOND

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 _____

SAMPLE: BID BOND

-18-

Bid No.

DOCUMENT 00420

DESIGNATION OF SUBCONTRACTORS

In compliance with the Subletting and Subcontracting Fair Practices Act of the Public Contract Code of the State of California, each bidder shall set forth below: (a) the name and the location of the place of business, (b) the California contractor license number, (c) DIR registration number, and (d) 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 in an amount in excess of one-half of one percent (1/2%) of the Contractor's Total Bid Price. If requested by the District, Bidders are required to submit the phone number, license expiration date and any other requested information for each subcontractor listed in its bid with in twenty-four (24) hours of bid opening. No time extension will be allowed for submission of information required by this document.

If no subcontractor is specified, for a portion of the work, or if more than one subcontractor is specified for the same portion of Work, to be performed under the Contract in excess of one-half of one percent (1/2%) of the Contractor's Total Bid Price, then the Contractor shall be deemed to have agreed that it is fully qualified to perform that Work, and that it shall perform that portion itself.

Note: If alternate bids are called for and Contractor intends to use different or additional subcontractors on the alternates, a separate list of subcontractors must be provided for each such alternate. Identify any such additional subcontractors by alternate bid number.

Company Name:	
Address:	Type of work:
Phone:	CSLB No.: Exp.
Fax:	DIR No.: Exp.
Company Name:	
Address:	Type of work:
Phone:	CSLB No.: Exp.
Fax:	DIR No.: Exp.

Company Name:	
Address:	Type of work:
Phone:	CSLB No.: Exp.
Fax:	DIR No.: Exp.
Company Name:	
Address:	Type of work:
Phone:	CSLB No.: Exp.
Fax:	DIR No.: Exp.
Company Name:	
Address:	Type of work:
Phone:	CSLB No.: Exp.
Fax:	DIR No.: Exp.
Company Name:	
Address:	Type of work:
Phone:	CSLB No.: Exp.
Fax:	DIR No.: Exp.
Company Name:	
Address:	Type of work:
Phone:	CSLB No.: Exp.
Fax:	DIR No.: Exp.

Company Name:	
Address:	Type of work:
Phone:	CSLB No.: Exp.
Fax:	DIR No.: Exp.
Company Name:	
Address:	Type of work:
Phone:	CSLB No.: Exp.
Fax:	DIR No.: Exp.
Company Name:	
Address:	Type of work:
Phone:	CSLB No.: Exp.
Fax:	DIR No.: Exp.

Name of Bidder _____

Signature _____

Name and Title _____

Dated _____

Article I.

DVBE POLICY

A. ***DISABLED VETERAN BUSINESS ENTERPRISE PARTICIPATION GOAL***

Submittals 24 hours after bid opening, Prime Bidder shall provide to Madera Unified Purchasing Department completed DVBE forms including (1) Contractor Good Faith Effort Worksheet and (2) Prime Bidder Certification of Disabled Veteran Business Enterprise Participation.

Definitions The term “Disabled Veteran Business Enterprise” (DVBE) means a business concern that is certified as a DVBE by the Office of Small and Minority Business.

The term “contract” means an agreement awarded by a school district in which all or part of the funding provided is required to meet DVBE Participation Goals or demonstrate that a good faith effort was made to meet the goal.

The term “bidder” means any person or persons, firm, partnership, corporation or combination thereof who makes an offer, competitive or noncompetitive, with the intent of forming a contract with one or more school districts.

Disabled Veterans In addition to the school districts contracting requirements, potential contractors seeking Business Enterprise to enter into contracts with school districts for labor, services, materials, supplies, Goals equipment, construction, alteration repair or improvement shall be required to meet a 3 percent participation goal for certified DVBE’s or demonstrate that a good faith effort was made to meet the goal.

A Business Enterprise with no opportunity for subcontracting or purchasing of supplies must provide a narrative and be able to demonstrate its inability to subcontract or purchase supplies if an audit occurs.

In order for any sole proprietorship, partnership, corporation or other enterprises to obtain certification or to be counted toward meeting the DVBE contract goals, such business concern must possess current and valid certification as a DVBE through the Office of Small and Minority Business.

For contracts awarded by competitive bid/RFP, a bidder should demonstrate fulfillment of this requirement at or prior to the time of bid opening in order to qualify as a responsive bidder. For contracts not awarded by competitive bid, a potential contractor should demonstrate fulfillment of this requirement prior to entering into the contract.

Any bidder meeting the 3 percent participation goal for DVBE’s may be eligible for award of a school district contract. If a bidder is unable to meet the 3 percent participation goal, the bidder may demonstrate a good faith effort by submitting documentation of the following actions:

- Contact was made with state agencies or with local DVBE organizations to identify DVBE’s;
- Advertising was published in trade papers and papers focusing on DVBE’S
- Invitations to bid were submitted to potential DVBE contractors; Available DVBE’s were considered.

DVBE POLICY (continued)

.....

The school district shall evaluate the effort made by the bidder to seek out and consider DVBE's as potential subcontractors, and/or material or equipment suppliers. In evaluating such effort, the school district should consider documentation of the actions specified above. Based on the evaluation, the school district may make a finding that the 3% DVBE participation goal or the good faith effort requirement has been met. The school district finding in this regard is subject to audit by OPSC. A bidder is eligible for award of a school district contract upon a finding by the school district that a 3% DVBE participation goal or good faith effort to meet the participation goal has been achieved.

If a bidder fails to meet either the goal, a good faith effort, or a narrative explaining its inability to meet the 3% goal, such bidder may be deemed not to be a responsive bidder for purposes of the school district's evaluation of an award of contract and may be ineligible for an award.

DVBE

.....

II. SUBSTITUTIONS

.....

Substitutions If awarded the contract, the successful bidder must use the DVBE subcontractor and/or supplier proposed in its bid unless the contractor requested a substitution from the school district prior to the execution of the contract and the District has approved such substitution. At a minimum, the request must include:

1. A written explanation of the reason for the substitution,
2. The identity of the person or firm substituted, and
3. Satisfactory evidence that the Contractor has made a good faith effort to satisfy DVBE contract participation certified in the bid.
4. The school district's approval or disapproval of the substitution is not to be construed as an excuse for noncompliance with any other provision of law including, but not limited to, the Subletting and Subcontracting Fair Practices Act or any other contract requirements relating to substitution of sub-contractors.
- 5.
6. FAILURE TO ADHERE TO AT LEAST THE DVBE PARTICIPATION PROPOSED BY THE SUCCESSFUL BIDDER MAY BE CAUSE FOR CONTRACT TERMINATION AND RECOVERY OF DAMAGES UNDER THE RIGHTS AND REMEDIES DUE THE DISTRICT UNDER THE DEFAULT SECTION OF THE CONTRACT.

CONTRACTOR GOOD FAITH EFFORT WORKSHEET

This worksheet is to be used to assist the Contractor in meeting the 3% DVBE participation goal.

BIDDER NAME	BUSINESS ADDRESS	CONTACT PERSON
TELEPHONE NUMBER	SCHOOL DISTRICT	COUNTY

GENERAL INSTRUCTIONS:

This worksheet is to be used to assist you in meeting the 3 percent DVBE participation goal. If specific information is not provided for Parts I through III, you may not meet the test of the "Good Faith Effort" and may not so certify. If you are qualifying based on a "Good Faith Effort" include this form with your bid/proposal to the district.

PART I – CONTACTS

To identify DVBE sub-contractors/suppliers for participation in your bid/proposal, contact should be made with at least one of the following categories. It is recommended that you contact DVBE organizations.

CATEGORY	TELEPHONE NUMBER	DATE CONTACTED	PERSON CONTACTED
1. Office of Small and Minority Business (OSMB)	916/375-4940		
OSMB publishes a list of Disabled Veteran Business Enterprises Internet: http://www.dgs.ca.gov/osmb	916/322-5060		
2. The California Disabled Veterans Alliance Internet: www.cadvbe.org	916-446-3510		
3.. DVBE Organizations (List):			

*Write "recorded message" in this column, if applicable

PART II – ADVERTISEMENTS You should make at least two (2) advertisements, one (1) in a paper that focuses on DVBE and one (1) in a trade paper. Advertisements should be published at least 14 days prior to bid/proposal opening; if you cannot advertise 14 days prior, advertise as soon as possible and provide an explanation. (Advertisements must be published in time to allow for a reasonable response). Advertisements should include that your firm is seeking DVBE participation, the project name and location, your firm's name, your firm's contact person, and phone number.

Attach copies of advertisements to this form.

FOCUS/TRADE PAPER NAME	CHECK ONE		DATE OF ADVERTISEMENT
	TRADE	FOCUS	

PART III – SOLICITATIONS List DVBE subcontractors/suppliers that were invited to bid. Use the following instructions to complete the remainder of this section (read the three columns as a sentence from left to right). If you need additional space to list DVBE solicitations, please use separate page and attach to this form.

IF THE DVBE	THEN.....	AND.....
was selected to participate	check "yes" in the "SELECTED" column, include the applicable dollar amount in Part III of the Form SAB 515PB	Include a copy of their DVBE letter from OSMB
Was not selected to participate	check "no" in the "SELECTED" column	State why in the "REASON NOT SELECTED" column
Did not respond to your solicitation	check the "NO RESPONSE" column	

DISABLED VETERANS BUSINESS ENTERPRISES CONTACTED	SELECTED		REASONS NOT SELECTED	NO RESPONSE
	YES	NO		

IMPORTANT NOTE:

Please be aware that certification of the "Good Faith Effort" may only be made by completing Parts , II, and III on both sides of this form. A copy of this form must be retained by you and may be subject to a future audit.

CERTIFICATION

I _____ certify that I am the bidder's Chief Executive Officer and that I have made a diligent effort to ascertain the facts with regard to the representations made herein. Further, I acknowledge that the school district, not the SAB/OPSC, is responsible for determining compliance with the DVBE Program. In making this certification, I am aware of Section 12650 et. seq. of the Government Code providing for the imposition of treble damages for making false claims.

Signature of Chief Executive Officer	Date
--------------------------------------	------

III CONTRACTOR CERTIFICATION OF DISABLED VETERAN

BUSINESS ENTERPRISE PARTICIPATION

To be completed by the Contractor

Page 1 of 2

A. ***PART I – IDENTIFICATION***

BIDDER'S NAME	BUSINESS ADDRESS	TELEPHONE NUMBER
SCHOOL DISTRICT	COUNTY	

B. **GENERAL INSTRUCTIONS**

The District requires that all contracts awarded should meet a DVBE participation goal of not less than 3 percent of the contract amount or if your firm cannot meet the 3 percent DVBE participation goal, you should demonstrate a good faith effort to attempt to meet the 3 percent participation. The District is responsible to assure compliance with the DVBE program

PART II – METHOD OF COMPLIANCE WITH DVBE PARTICIPATION GOALS – Include this form and any other applicable documents listed in this table with your bid/proposal. Read the three columns in the table below as sentences from left to right. Check the appropriate box to indicate your method of committing the contract dollar amount. If no box can be checked, your bid/proposal may be deemed non-responsive and disqualified.

NOTE: Architectural, engineering, environmental, land surveying or construction management firms must indicate their method of compliance by marking the appropriate box A, B, C, or D after selection by the District and before the contract is signed.

<i>1) YOUR BUSINESS ENTERPRISE</i>	<i>AND YOU</i>	<i>AND YOU</i>
A. ف is Disabled Veteran owned and your force, will perform at least 3 percent of this contract	will include a copy of your DVBE letter from the office of Small Minority Business (OSMB).	
B. ف Is Disabled Veteran owned but is unable to perform the 3 percent of this contract with your forces	will use DVBE subcontractors/suppliers to bring the contract participation to at least 3 percent	will include copy of each DVBE's letter from OSMB (including yours, if applicable).
C. ف is not Disabled Veteran owned	will use DVBE subcontractors/suppliers for at least 3 percent of this contract	
D. ف is unable to meet the required Participation goals	will complete a Good Faith Effort to obtain DVBE participation	will include the form Prim Bidder's Good Faith Effort Worksheet

NOTE: An Office of Small and Minority Business (OSMB) letter must be attached for each DVBE participating in the contract. The DVBE letter is obtained by application through OSMB and must be provided at the time of bid opening. If the letter is not provided, the bid may be deemed non-responsive and may be ineligible for award of the contract.

III. PART III – DVBE DOLLAR PARTICIPATION OF BID/PROPOSAL – Architectural, engineering, environmental, land surveying management firms complete this part after selection by the district and before the contract is signed.

Show deductive alternate(s) in parenthesis. For more alternates/base bids, use a separate page to show items.

- A. If your business enterprise is a DVBE, list in the appropriate column the D. Enter the dollar amount of the bid/proposal to be performed by non-DVBE firms. total dollar amount of your bid to be performed by your own participation.
Note: This line is the sum of the prime and subcontractor(s) non-DVBE dollar participation.
- B. List all your DVBE subcontractors/suppliers. Enter in the appropriate column the dollar amount for each of your subcontractors/suppliers. Aware that the final determination of DVBE compliance is made based on the contract amount resulting from the district's acceptance or rejection of alternates. Enter the total of Lines A and B for each column.
- E. Enter the Sum of the column totals from Line C and Line D. Note: Please be aware that the final determination of DVBE compliance is made based on the contract amount resulting from the district's acceptance or rejection of alternates.

	Section 1.02 <i>BASE BID/PROPOSAL</i>	(a) Alt. #1	(b) Alt. #2	(c) Alt. #3 OR BASE BID B	(d) Alt.#4 OR BASE BID C	(e).#5 (Modernization or Reconstruction Only)
A. Contractor, if DVBE (own participation)	\$	\$	\$	\$	\$	\$
B. DVBE Subcontractor or Supplier						
1.						
2.						
3.						
4.						
C. Subtotal (A & B)						
D. Non-DVBE						
E. Total Bid						

**DOCUMENT 00440
PROJECT LISTINGS**

A. LIST OF CURRENT PROJECTS

[**Duplicate Page if needed for listing additional current projects.**]

Project/Client:	Contact Person:
Email:	Phone:
Scope of work:	
Value of Contract:	Projected Completion Date:

Project/Client:	Contact Person:
Email:	Phone:
Scope of work:	
Value of Contract:	Projected Completion Date:

Project/Client:	Contact Person:
Email:	Phone:
Scope of work:	
Value of Contract:	Projected Completion Date:

Project/Client:	Contact Person:
Email:	Phone:
Scope of work:	
Value of Contract:	Projected Completion Date:

PROJECT LISTINGS

B. LIST OF COMPLETED PROJECTS - LAST THREE YEARS

[**Duplicate Page if needed for listing additional completed projects.**]

Please include only those projects which are similar enough to demonstrate Bidder's ability to perform the required Work.

Project/Client:	Contact Person:
Email:	Phone:
Scope of work:	
Value of Contract:	Completion Date:

Project/Client:	Contact Person:
Email:	Phone:
Scope of work:	
Value of Contract:	Completion Date:

Project/Client:	Contact Person:
Email:	Phone:
Scope of work:	
Value of Contract:	Completion Date:

Project/Client:	Contact Person:
Email:	Phone:
Scope of work:	
Value of Contract:	Completion Date:

PROJECT LISTINGS

DOCUMENT 00450

ASBESTOS-FREE MATERIALS CERTIFICATION

The undersigned declares that he or she is the person who executed the bid for the _____
_____ (hereinafter referred to as the "Project"), and submitted it to the Madera Unified
School District (hereinafter referred to as the "District") on behalf of _____
(hereinafter referred to as the "Contractor").

To the best of my knowledge, information and belief, in completing the Contractor's Work for
the Project, no material furnished, installed or incorporated into the Project will contain, or in
itself be composed of, any materials listed by the federal or state EPA or federal or state health
agencies as a hazardous material.

Any disputes involving the question of whether or not material installed with asbestos-containing
equipment is settled by electron microscopy; the cost of any such tests shall be paid by the
Contractor.

All work or materials installed by the Contractor which is found to contain asbestos, or work or
material installed with asbestos-containing equipment, will be immediately rejected and this
work shall be removed and replaced by the Contractor at no additional cost to the District.

Decontamination and removal of work found to contain asbestos or work installed with asbestos-
containing equipment shall be done only under supervision of a qualified consultant,
knowledgeable in the field of asbestos abatement and accredited by the Environmental Protection
Agency.

The ASBESTOS REMOVAL CONTRACTOR shall be an EPA accredited contractor qualified
in the removal of asbestos and shall be chosen and approved by the Asbestos Consultant who
shall have sole discretion and final determination in this matter.

The asbestos consultant shall be chosen and approved by the Construction Manager/Architect or
the District who shall have sole discretion and final determination in this matter.

The work will be not accepted until asbestos contamination is reduced to levels deemed
acceptable by the Asbestos Consultant.

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

Executed on this _____ day of _____, 20____ at _____.

Name of Contractor (Print or Type)

By _____
Signature Print Name

ASBESTOS-FREE MATERIALS CERTIFICATION

DOCUMENT 00460

RECYCLED CONTENT CERTIFICATION

The undersigned declares that he or she is the person who executed the bid for the _____ (hereinafter referred to as the “Project”), and submitted it to the Madera Unified School District (hereinafter referred to as the “District”) on behalf of _____ hereinafter referred to as the “Contractor”).

Pursuant to Public Contract Code Sections 12205 and 22152, all contractors are required to certify in writing under penalty of perjury the minimum (if not exact) percentage of recycled content in materials, goods, or supplies offered or products used in the performance of their contract, regardless of whether the product meets the required recycled product percentage as defined in Public Contract Code Section 12209. The recycled content shall include both post-consumer material and secondary material as defined in Public Contract Code Section 12200 shall apply.

I declare under penalty of perjury under the laws of the State of California that the following percentages of Post-consumer Material and Secondary Material is in the materials, goods or supplies offered for, or products used in, the performance of the Contract for the Project:

_____ % Post consumer Material _____ % Secondary Material.

Executed on this _____ day of _____, 20 at _____
_____.

Name of Contractor (Print or Type)

By _____
Signature

Print Name

Title

RECYCLED CONTENT CERTIFICATION

CONTRACTOR & SUBCONTRACTOR FINGERPRINTING REQUIREMENTS

~~CONTRACTOR CERTIFICATION~~

~~With respect to the Contract dated _____ 20__ by and between Madera Unified School District ("District") and _____ ("Contractor"), Contractor hereby certifies to the District's governing board that it has completed the criminal background check requirements of Education Code Section 45125.1 and that none of its employees that may come in contact with District's pupils have been convicted of a violent felony listed in Penal Code section 667.5(c) or a serious felony listed in Penal Code section 1192.7(c).~~

~~_____
Contractor's Representative _____ Date~~

CONTRACTOR EXEMPTION

Pursuant to Education Code sections 45125.1 and 45125.2, the Madera Unified School District ("District") has determined that _____ ("Contractor") is exempt from the criminal background check certification requirements for the Contract dated _____, 20__ by and between the District and Contractor ("Contract") because:

The Contractor's employees will have limited contact with District students during the course of the Contract;

Emergency or exceptional circumstances exist; or

With respect to contractors constructing, reconstructing, rehabilitating or repairing a school facility, as provided in Section 45125.2, the Contractor has agreed to ensure the safety of pupils at the school facility by the following method(s) specified in Section 45125.2: _____.

School District Official _____ Date

CONTRACTOR & SUBCONTRACTOR FINGERPRINTING REQUIREMENTS

CONTRACTOR & SUBCONTRACTOR FINGERPRINTING REQUIREMENTS

SUBCONTRACTOR'S CERTIFICATION

~~(For each subcontractor who will perform work on the Project, this form shall be submitted after the award of Contract, prior to the commencement of work.)~~

~~The Madera Unified School District ("District") entered into a Contract for services with _____ ("Contractor") on or about _____, 20____ ("Contract"). This certification is submitted by _____, a subcontractor to the Contractor for purposes of that Contract ("Subcontractor"). Subcontractor hereby certifies to the District's governing board that it has completed the criminal background check requirements of Education Code section 45125.1 and that none of its employees that may come in contact with District pupils have been convicted of a violent felony listed in Penal Code section 667.5(c) or a serious felony listed in Penal Code section 1192.7(c).~~

Subcontractor's Representative Date

SUBCONTRACTOR'S EXEMPTION

The Madera Unified School District ("District") entered into a Contract for services with _____ ("Contractor") on or about _____, 20____ ("Contract"). Pursuant to Education Code sections 45125.1 and 45125.2, the District has determined that _____, a subcontractor to the Contractor for purposes of that Contract ("Subcontractor"), is exempt from the criminal background check certification requirements for the Contract because:

The Subcontractor's employees will have limited contact with District students during the course of the Contract;

Emergency or exceptional circumstances exist; or

With respect to contractors constructing, reconstructing, rehabilitating or repairing a school facility, as provided in Section 45125.2, the Contractor and/or Subcontractor have agreed to ensure the safety of pupils at the school facility by the following method(s) specified in Section 45125.2: _____.

School District Official

Date

CONTRACTOR & SUBCONTRACTOR FINGERPRINTING REQUIREMENTS

DOCUMENT 00480

DRUG-FREE WORKPLACE CERTIFICATION

This Drug-Free Workplace Certification form is part of the Contract made by and between the Madera Unified School District (hereinafter referred to as the "District") and

_____ (hereinafter referred to as the "Contractor") for the _____ Project (hereinafter referred to as the "Project"). This form is required from all successful bidders pursuant to the Drug-Free Workplace Act of 1990 (Government Code Section 8350 et seq.) The Drug-Free Workplace Act of 1990 requires that every person or organization awarded a contract or grant for procurement of any property or service from any State agency must certify that it will provide a drug-free workplace by doing certain specified acts. In addition, the Act provides that each contract or grant awarded by a State agency may be subject to suspension of payments or termination, and the contractor or grantee may be subject to debarment from future contracting, if the contracting agency determines that specified acts have occurred.

Pursuant to Government Code Section 8355, every person or organization awarded a contract or grant from a State agency shall certify that it will provide a drug-free workplace by doing all of the following:

A. Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensation, possession or use of a controlled substance is prohibited in their workplace and specifying actions which will be taken against employees for violations of the prohibition;

B. Establishing a drug-free awareness program to inform employees about all of the following:

1. The dangers of drug abuse in the workplace;
2. The person's or organization's policy of maintaining a drug-free workplace;
3. The availability of drug counseling, rehabilitation and employee-assistance programs; and
4. The penalties that may be imposed upon employees for drug abuse violations.

C. Requiring that each employee engaged in the performance of the contract or grant be given a copy of the statement required by subdivision "A," and that, as a condition of employment on the contract or grant, the employee agrees to abide by the terms of the statement.

CONTRACTOR & SUBCONTRACTOR FINGERPRINTING REQUIREMENTS

I, the undersigned, agree to fulfill the terms and requirements of the Drug-Free Workplace Act as it now exists or may hereinafter be amended. Particularly, I shall abide by Government Code Section 8355 when performing the Contract for the Project by:

- A. Publishing a statement notifying employees concerning the prohibition of controlled substance at my workplace;
- B. Establishing a drug-free awareness program; and
- C. Requiring that each employee engaged in the performance of the contract be given a copy of the statement required by Section 8355(a) and agree to abide by the terms of that statement.

I also understand that if the District determines that I have either: (a) made a false certification herein; or (b) violated this certification by failing to carry out the requirements of Section 8355, the Contract awarded herein is subject to termination, suspension of payments, or both. I further understand that if I violate the terms of the Drug-Free Workplace Act of 1990, I may be subject to debarment in accordance with the requirements of the Act.

I acknowledge that I am aware of the provisions of Government Code Section 8350 et seq., and hereby certify that I will adhere to the requirements of the Drug-Free Workplace Act of 1990.

Executed on this _____ day of _____,
20_____ at _____.

Name of Contractor (Print or Type)

By _____
Signature

Print Name

Title

DRUG-FREE WORKPLACE CERTIFICATION

DOCUMENT 00482

**CONTRACTOR'S CERTIFICATE REGARDING ALCOHOLIC BEVERAGE and
TOBACCO-FREE CAMPUS POLICY**

The Contractor agrees that it will abide by and implement the District's Alcoholic Beverage and Tobacco-Free Campus Policy, which prohibits the use of alcoholic beverages and tobacco products, at any time, on District-owned or leased buildings, on District property and in District vehicles. The Contractor shall procure signs stating "ALCOHOLIC BEVERAGE AND TOBACCO USE IS PROHIBITED" and shall ensure that these signs are prominently displayed in all entrances to school property at all times.

DATE: _____

CONTRACTOR

By: _____

Signature _____

DOCUMENT 00485

PUBLIC WORKS CONTRACTOR REGISTRATION CERTIFICATION

If this bid is due on or after March 1, 2015, then pursuant to Labor Code sections 1725.5 and 1771.1, all contractors and subcontractors that wish to bid on, be listed in a bid proposal, or enter into a contract to perform public work must be registered with the Department of Industrial Relations. See <http://www.dir.ca.gov/Public-Works/PublicWorks.html> for additional information.

No bid will be accepted nor any contract entered into without proof of the contractor's and subcontractors' current registration with the Department of Industrial Relations to perform public work.

Bidder hereby certifies that it is aware of the registration requirements set forth in Labor Code sections 1725.5 and 1771.1 and is currently registered as a contractor with the Department of Industrial Relations.

Name of Bidder: _____

DIR Registration Number: _____

Bidder further acknowledges:

- (1) Bidder shall maintain a current DIR registration for the duration of the project.
- (2) Bidder shall include the requirements of Labor Code sections 1725.5 and 1771.1 in its contract with subcontractors and ensure that all subcontractors are registered at the time of bid opening and maintain registration status for the duration of the project.
- (3) Failure to submit this form or comply with any of the above requirements may result in a finding that the bid is non-responsive.

Name of Bidder _____

Signature _____

Name and Title _____

Dated _____

DOCUMENT 00490

NON-COLLUSION DECLARATION

The undersigned declares:

I am the _____(Title) of _____(Firm), the party making the foregoing bid.

The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder. All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose.

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

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on _____(Date), at _____(City), _____(State).

By:_____

Printed Name:_____

Date:_____

DOCUMENT 00494
E.O. N-6-22



**MADERA UNIFIED
SCHOOL DISTRICT**
1902 Howard Road
Madera CA 93637
(559) 675-4500
(559) 675-1186 Fax
www.madera.k12.ca.us

Board of Trustees:

President:
Ed McIntyre

Clerk:
Lucy Salazar

Trustees:
Nadeem Ahmad
Isreal Cortez
Joetta Fleak
Ruben Mendoza
Ray G. Seibert

SUPERINTENDENT:
Todd Lile

NOTICE

April 26, 2022

To: Contractors and Vendors

From: Sandon Schwartz, Deputy Superintendent

**Re: Contractor and Grantee Compliance with Economic Sanctions
Imposed in Response to Russia's Actions in Ukraine**

On March 4, 2022, Governor Gavin Newsom issued Executive Order N-6-22 (EO) regarding sanctions in response to Russian aggression in Ukraine. The EO is located at <https://www.gov.ca.gov/wp-content/uploads/2022/03/3.4.22-Russia-Ukraine-ExecutiveOrder.pdf>

The EO directs all agencies and departments that are subject to the Governor's authority to take certain immediate steps, including notifying all contractors and grantees of their obligations to comply with existing economic sanctions imposed by the U.S. government in response to Russia's actions in Ukraine, as well as any sanctions imposed under state law.

This correspondence serves as a notice under the EO that as a contractor or grantee, compliance with the economic sanctions imposed in response to Russia's actions in Ukraine is required, including with respect to, but not limited to, the federal executive orders identified in the EO and the sanctions identified on the U.S. Department of the Treasury website <https://home.treasury.gov/policy-issues/financial-sanctions/sanctions-programs-and-country-information/ukraine-russia-related-sanctions>. Failure to comply may result in the termination of contracts or grants, as applicable. Please note that for any agreements or grants valued at \$5 million or more, a separate notification will be sent outlining additional requirements specified under the EO.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Sandon Schwartz', is written over a horizontal line.

Sandon Schwartz
Deputy Superintendent

Signature signifies acknowledgement of E.O. N-6-22

Signature_____

DOCUMENT 00495
IRAN CONTRACTING ACT CERTIFICATION
(TO BE EXECUTED AND SUBMITTED WITH BID)
Public Contract Code Sections 2202-2208

Pursuant to Public Contract Code 2204.(a) A public entity shall require a person that is submits a bid or proposal to, or otherwise proposes to enter into or renew a contract with, a public entity with respect t a contract for goods or services of one million dollars (\$1,000,000) or ore to certify, at the time the bid is submitted or the contract is renewed, that the person is not identified on a list created pursuant to subdivision (b) of Section 2203 as a person engaging in investment activities in Iran described in subdivision (a) of Section 2202.5 or as a person described in subdivision 9b) of Section 2202.5, as applicable.

To comply with this requirement, please insert your company/entity and Federal ID number (if available) and complete **one** of the options below. Please note, California law established penalties for providing false certifications, including civil penalties equal to the greater of \$250,000 or twice the amount of the contract for which the false certification was made, contract termination and three-year ineligibility to bid on contract in accordance with Public Contract Code section 2205.

OPTION No.1 – CERTIFICATION

I, the official named below, certify I am duly authorized to execute this certification on behalf of the company/entity identified below, and the company/entity identified below is not on the current list of persons engaged in investment activities in Iran created by DGS and is not a financial institution extending twenty million dollars (\$20,000,000) or more in credit to another person or entity, for 45 days or more, if that other person or company/entity will use the credit to provide goods or services in the energy sector in Iran and is identified on the current list of persons engaged in investment activities in Iran created by DGS in accordance with subdivision (b) of Public Contract Code 2203

Company Name/Financial Institution (printed)

Federal ID Number (or n/a)

By (Authorized Signature)

Printed Name & Title of Person Signing

Date Executed

Executed in the County of _____ in

The State of _____

OPTION No.2 – EXEMPTION

Pursuant to Public Contract Code sections 2203(c) and (d), a public entity may permit a vendor/financial institution engaged in investment activities in Iran, on a case-by-case basis, to be eligible for, or to bid on, submit a proposal for, or enters into or renews, a contract for goods and services

If you have obtained an exemption from the certification requirement under the Iran Contracting Act, please fill out the information below and attach documentation demonstrating the exemption approval.

Vendor Name/Financial Institution (Printed)

Federal ID Number (or n/a)

By (Authorized Signature)

Printed Name & Title of Person Signing

Date Executed

DOCUMENT 00499
Notary Acknowledgment
(sample form)

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

STATE OF CALIFORNIA
COUNTY OF _____

On _____, 20____, before me, _____, Notary Public, personally
appeared _____, who proved to me on the basis of satisfactory

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

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

WITNESS my hand and official seal.

Signature of Notary Public

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

CAPACITY CLAIMED BY SIGNER

DESCRIPTION OF ATTACHED DOCUMENT

- ☐ Individual
☐ Corporate Officer

Title(s)

- ☐ Partner(s) ☐ Limited
 ☐ General

- ☐ Attorney-In-Fact
☐ Trustee(s)
☐ Guardian/Conservator
☐ Other:

Signer is representing:
Name Of Person(s) Or Entity(ies)

Title or Type of Document

Number of Pages

Date of Document

Signer(s) Other Than Named Above

DOCUMENT 00500

CONTRACT

THIS CONTRACT is made this ____ day of _____, 20__, in the County of Madera, State of California, by and between the MADERA UNIFIED SCHOOL DISTRICT, hereinafter called District, and _____, hereinafter called Contractor. The District and the Contractor for the considerations stated herein agree as follows:

WHEREAS the District and the Contractor for the considerations stated herein agree as follows:

ARTICLE 1. SCOPE OF WORK. The Contractor shall perform all Work within the time stipulated the Contract and shall provide all labor, materials, equipment, tools, utility services, and transportation to complete all of the Work required in strict compliance with the Contract Documents as specified in Article 5 below for the following Project:

Bid No.

The Contractor and its surety shall be liable to the District for any damages arising as a result of the Contractor's failure to comply with this obligation, and the Contractor shall not be excused with respect to any failure to so comply by act or omission of the Construction Manager, Architect, Engineer, Inspector, Division of the State Architect, or representative of any of them, unless such act or omission actually prevents the Contractor from fully complying with the Contract Documents and the Contractor protests, in accordance with the Contract Documents that the act or omission is preventing the Contractor from fully complying with the Contract Documents. Such protest shall not be effective unless reduced to writing and filed with the District office within five (5) days of the date of occurrence of the act or omission preventing the Contractor from fully complying with the Contract Documents.

ARTICLE 2. TIME FOR COMPLETION. The Work shall be commenced on the date stated in the District's Notice to Proceed. The Contractor shall complete all Work required by the Contract Documents within Ninety (90) calendar days from the commencement date stated in the Notice to Proceed. By its signature hereunder, Contractor agrees the time for completion set forth above is adequate and reasonable to complete the Work.

ARTICLE 3. CONTRACT PRICE. The District shall pay to the Contractor as full compensation for the performance of the Contract, subject to any additions or deductions as provided in the Contract Documents, and including all applicable taxes and costs, the sum of _____ Dollars (\$_____). Payment shall be made as set forth in the General Conditions.

ARTICLE 4. LIQUIDATED DAMAGES. The Contractor acknowledges that the District will sustain actual damages for each and every day completion of the Project is delayed beyond the

Contract Time. Because of the nature of the Project, it would be impracticable or extremely difficult to determine the District's actual damages. Accordingly, as provided in Government Code section 53069.85, it is agreed that the Contractor will pay the District the sum of **\$1000.00** for each and every calendar day of delay in completing the Work beyond the time prescribed in the Contract Documents for finishing the Work, as Liquidated Damages and not as a penalty or forfeiture. In the event the Liquidated Damages are not paid, the Contractor agrees the District may deduct that amount from any money due or that may become due the Contractor under the Contract. This Article does not affect the District's rights to other damages or remedies specified in the Contract Documents or allowed by law.

Should Contractor be inexcusably delayed in the performance of the Work, District may deduct Liquidated Damages based on its estimate of when Contractor will achieve Final Completion or other milestones. District need not wait until Final Completion to withhold Liquidated Damages from Contractor.

Liquidated Damages are not a penalty but an agreed upon estimate of the actual damages that would be sustained by the District for delay, including but not limited to loss of revenue, inconvenience to the District and the public, and increased Project administration expenses, such as extra inspection, construction management, staff time and architectural and engineering expenses. Liquidated Damages do not include actual damages the District incurs on account of claims by third parties against the District on account of any delay.

Should money due or to become due to the Contractor be insufficient to cover Liquidated Damages or other offsets due, then Contractor forthwith shall pay the remainder of the assessed liquidated damages to District.

ARTICLE 5. COMPONENT PARTS OF THE CONTRACT. The "Contract Documents" include the following, all of which are component parts of this Contract as if herein set out in full or attached hereto:

- Notice Inviting Bids
- Information for Bidders
- Prime Point of Contact
- Bid Form
- Contractor's Certificate Regarding Workers' Compensation
- Bid Bond
- Designation of Subcontractors
- Project Listings
- Designation of DVBE Subcontractors
- Asbestos-Free Material Certification
- Drug-Free Workplace Certifications
- Alcohol and Tobacco Free Campus Certifications
- Recycled Content Certification
- Public Works Contractor Registration Certification
- Non-Collusion Declaration
- Executive Order N-6-22

Iran Contracting Act Certification
Contract
Performance Bond
Payment Bond
General Conditions
Special Conditions
Technical Specifications
Addenda
Plans and Drawings
Approved and fully executed change orders
Any other documents contained in or incorporated into the Contract

The Contractor shall complete the Work in strict accordance with all of the Contract Documents. All of the Contract Documents are intended to be complementary. Work required by one of the Contract Documents and not by others shall be done as if required by all. This Contract shall supersede any prior agreement of the parties.

ARTICLE 6. PROVISIONS REQUIRED BY LAW. Each and every provision of law required to be included in these Contract Documents shall be deemed to be included in these Contract Documents, which shall be read and enforced as though it were included herein. The Contractor shall comply with all requirements of the California Labor Code applicable to this Project.

ARTICLE 7. SUBSTITUTION OF SECURITIES. At the request and expense of the successful Bidder, the District will substitute securities for the amount so retained in accordance with Public Contract Code Section 22300.

ARTICLE 8. INDEMNIFICATION. Contractor shall provide indemnification as set forth in the General Conditions.

ARTICLE 9. PREVAILING WAGES. Contractor shall comply with the prevailing wage provisions of the California Labor Code and the prevailing wage rate determinations of the Department of Industrial Relations. These rates are on file at the District's Purchasing Department located at 1205 South Madera Avenue, Madera, CA 93637 or may be obtained online at <http://www.dir.ca.gov/dlsr>. A copy of these rates shall be posted at the job Site.

ARTICLE 10. RECORD AUDIT. In accordance with Government Code, Section 8546.7, records of both the District and the Contractor shall be subject to examination and audit by the Auditor General for a period of three (3) years after final payment.

IN WITNESS WHEREOF, this Contract has been duly executed by the above-named parties, on the day and year above written.

<p><u>[NAME OF CONTRACTOR]</u></p> <p>By _____</p> <p>Name and Title: _____</p> <p>License No. _____</p> <p>(Corporate Seal)</p>	<p><u>MADERA UNIFIED SCHOOL DISTRICT</u></p> <p>By _____</p> <p>Its: _____</p>
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DOCUMENT 00600

PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS:

THAT WHEREAS, the Madera Unified School District (hereinafter referred to as "District") has awarded to _____, (hereinafter referred to as the "Contractor") _____ an agreement for _____ (hereinafter referred to as the "Project").

WHEREAS, the work to be performed by the Contractor is more particularly set forth in the Contract Documents for the Project dated _____, (hereinafter referred to as "Contract Documents"), the terms and conditions of which are expressly incorporated herein by reference; and

WHEREAS, the Contractor is required by said Contract Documents to perform the terms thereof and to furnish a bond for the faithful performance of said Contract Documents.

NOW, THEREFORE, we, _____, the undersigned Contractor and _____ as Surety, a corporation organized and duly authorized to transact business under the laws of the State of California, are held and firmly bound unto the District in the sum of _____ DOLLARS, (\$_____), said sum being not less than one hundred percent (100%) of the total amount of the Contract, for which amount well and truly to be made, we bind ourselves, our heirs, executors and administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that, if the Contractor, 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 Contract Documents and any alteration thereof made as therein provided, on its part, to be kept and performed at the time and in the manner therein specified, and in all respects according to their intent and meaning; and shall faithfully fulfill all obligations including the one-year guarantee of all materials and workmanship; and shall indemnify and save harmless the District, its officers and agents, as stipulated in said Contract Documents, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect.

As a part of the obligation secured hereby and in addition to the face amount specified therefore, there shall be included costs and reasonable expenses and fees including reasonable attorney's fees, incurred by District in enforcing such obligation.

As a condition precedent to the satisfactory completion of the Contract Documents, unless otherwise provided for in the Contract Documents, the above obligation shall hold good for a period of one (1) year after the acceptance of the work by District, during which time if Contractor shall fail to make full, complete, and satisfactory repair and replacements and totally protect the District from loss or damage resulting from or caused by defective materials or faulty workmanship. The obligations of Surety hereunder shall continue so long as any obligation of

Contractor remains. Nothing herein shall limit the District's rights or the Contractor or Surety's obligations under the Contract, law or equity, including, but not limited to, California Code of Civil Procedure section 337.15.

Whenever Contractor shall be, and is declared by the District to be, in default under the Contract Documents, the Surety shall remedy the default pursuant to the Contract Documents, or shall promptly, at the District's option:

- (1) Take over and complete the Project in accordance with all terms and conditions in the Contract Documents; or
- (2) Obtain a bid or bids for completing the Project in accordance with all terms and conditions in the Contract Documents and upon determination by Surety of the lowest responsive and responsible bidder, arrange for a Contract between such bidder, the Surety and the District, and make available as work progresses sufficient funds to pay the cost of completion of the Project, less the balance of the contract price, including other costs and damages for which Surety may be liable. The term "balance of the contract price" as used in this paragraph shall mean the total amount payable to Contractor by the District under the Contract and any modification thereto, less any amount previously paid by the District to the Contractor and any other set offs pursuant to the Contract Documents.
- (3) Permit the District to complete the Project in any manner consistent with California law and make available as work progresses sufficient funds to pay the cost of completion of the Project, less the balance of the contract price, including other costs and damages for which Surety may be liable. The term "balance of the contract price" as used in this paragraph shall mean the total amount payable to Contractor by the District under the Contract and any modification thereto, less any amount previously paid by the District to the Contractor and any other set offs pursuant to the Contract Documents.

Surety expressly agrees that the District may reject any contractor or subcontractor which may be proposed by Surety in fulfillment of its obligations in the event of default by the Contractor.

Surety shall not utilize Contractor in completing the Project nor shall Surety accept a bid from Contractor for completion of the Project if the District, when declaring the Contractor in default, notifies Surety of the District's objection to Contractor's further participation in the completion of the Project.

The Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract Documents or to the Project to be performed thereunder shall in any way affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract Documents or to the Project.

IN WITNESS WHEREOF, we have hereunto set our hands and seals this _____ day of _____, 20__.

CONTRACTOR/PRINCIPAL

Name

By _____

SURETY:

By: _____
Attorney-In-Fact

The rate of premium on this bond is _____ per thousand. The total amount of premium charges, \$_____.
(The above must be filled in by corporate attorney.)

THIS IS A REQUIRED FORM

Any claims under this bond may be addressed to:

(Name and Address of Surety)

(Name and Address of Agent or Representative for service of process in California, if different from above)

(Telephone number of Surety and Agent or Representative for service of process in California)

DOCUMENT 00499
Notary Acknowledgment
(sample form)

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

STATE OF CALIFORNIA
COUNTY OF _____

On _____, 20____, before me, _____, Notary Public, personally
appeared _____, who proved to me on the basis of satisfactory

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

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

WITNESS my hand and official seal.

Signature of Notary Public

OPTIONAL

*Though the information below is not required by law, it may prove valuable to persons relying on the document
and could prevent fraudulent removal and reattachment of this form to another document.*

CAPACITY CLAIMED BY SIGNER

DESCRIPTION OF ATTACHED DOCUMENT

- ☐ Individual
☐ Corporate Officer

Title(s)

- ☐ Partner(s) ☐ Limited
 ☐ General

- ☐ Attorney-In-Fact
☐ Trustee(s)
☐ Guardian/Conservator
☐ Other:

Signer is representing:
Name Of Person(s) Or Entity(ies)

Title or Type of Document

Number of Pages

Date of Document

Signer(s) Other Than Named Above

NOTE: This acknowledgment is to be completed for Contractor/Principal.

DOCUMENT 00610

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS that

WHEREAS, the Madera Unified School District (hereinafter designated as the "District"), 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

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 District 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 9100 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 District 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 9100 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

Bid No.

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 District 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 9100 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 presents duly signed b its undersigned representative pursuant to authority of its governing body.

(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.

DOCUMENT 00700
GENERAL CONDITIONS

ARTICLE 1. DEFINITIONS

- a. Acceptable, Acceptance or words of similar import shall be understood to be the acceptance of the District Representative and/or the District .
- b. Act of God means an earthquake of at least a magnitude 3.5 on the Richter scale or tidal waves.
- c. Approval means written authorization by District Representative and/or District.
- d. Architect means the architect employed by District to provide architecture and related services for the Project.
- e. As Builts means drawings prepared by the Contractor that show the original design drawings revised to reflect any changes made in the field, i.e., design changes issued by change order, component relocations required for coordination, rerouting of distribution systems, etc., and that show the exact dimensions and locations of work that will be concealed during construction.
- f. Construction Manager means the construction manager, if any, employed by the District to provide construction management and related services for the Project.
- g. Contract or Contract Documents includes all contract documents as stated in the Contract.
- h. Day shall mean calendar day unless otherwise specifically designated.
- i. District and Contractor are those stated in the Contract. The terms District and Owner may be used interchangeably.
- j. District Representative shall mean **Curtis Manganaan, Director of Maintenance and Operations**, or his/her designee, acting either directly or through properly authorized agents, such as agents acting within the scope of the particular duties entrusted to them. Also sometimes referred to as the “District’s Representative” or “Representative” in the Contract Documents.
- k. Equal, Equivalent, Satisfactory, Directed, Designated, Selected, As Required and similar words shall mean the written approval, selection, satisfaction, direction, or similar action of the District Representative and/or District.

- l. 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 District Representative and/or District is intended, unless stated otherwise.
- m. Install means the complete installation of any item, equipment or material.
- n. Material shall include machinery, equipment, manufactured articles, or construction such as form work, fasteners, etc., and any other classes of material to be furnished in connection with the Contract. All materials shall be new unless specified otherwise.
- o. Perform shall mean that the Contractor, at Contractor's expense, shall take all actions necessary to complete The Work, including furnishing of necessary labor, tools, and equipment, and providing and installing Materials that are indicated, specified, or required to complete such performance.
- p. Project is The Work planned by District as provided in the Contract Documents.
- q. Provide shall include provide complete in place, that is furnish, install, test and make ready for use.
- r. Recyclable Waste Materials shall mean materials removed from the Project Site which are required to be diverted to a recycling center rather than an area landfill. Recyclable Waste Materials include asphalt, concrete, brick, concrete block, and rock.
- s. 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 District, unless stated otherwise.
- t. Specifications means that portion of the Contract Documents consisting of the written requirements for materials, equipment, construction systems, standards and workmanship for the work.
- u. Site or Project Site is the lands and facilities upon which The Work is to be performed, including such access to other lands and facilities designated in the Contract Documents.
- v. 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.
- w. 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.

- x. The Work means the entire improvement planned by the District pursuant to the Contract Documents.
- y. Work means labor, equipment and materials incorporated in, or to be incorporated in the construction covered by the Contract Documents.
- z. Worker includes laborer, worker, or mechanic, and any supervisors thereto.

ARTICLE 2. CONTRACT DOCUMENTS

- a. **Contract Documents.** The Contract Documents are complementary, and what is called for by one shall be as binding as if called for by all. The intention of the Contract Documents is to provide the District 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.** The Contract Documents are intended to be fully cooperative and to be complementary. If Contractor observes that any documents are in conflict, the Contractor shall promptly notify the District Representative in writing by submission of a Request for Information. The Request for Information procedure may not be used to request any changes which shall be adjusted as provided in the Contract Documents for changes in work. In case of conflicts between the Contract Documents, the order of precedence shall be as follows:
 - 1. Change Orders or Work Change Directives
 - 2. Addenda
 - 3. Special Provisions (or Special Conditions)
 - 4. Technical Specifications
 - 5. Plans (Contract Drawings)
 - 6. Contract
 - 7. General Conditions
 - 8. Project Listings
 - 9. Notice Inviting Bids
 - 10. Contractor's Bid Forms
 - 11. Standard Plans
 - 12. Reference Documents

With reference to the Drawings, the order of precedence shall be as follows:

- 1. Figures govern over scaled dimensions
- 2. Detail drawings govern over general drawings
- 3. Addenda or Change Order drawings govern over Contract Drawings
- 4. Contract Drawings govern over Standard Drawings

5. Contract Drawings govern over Shop Drawings
- c. **Conflicts in Contract Documents.** Notwithstanding the orders of precedence established above, in the event of conflicts, the higher standard shall always apply.
- d. **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.
- e. **Addenda and Deferred Approvals.** Addenda shall govern over all other Contract Documents. Subsequent addenda issued shall govern over prior addenda only to the extent specified. In accordance with Titles 21 and 24 of the California Code of Regulations, addenda shall be approved by the Department of State Architect ("DSA"). The requirements approved by the DSA on any item submitted as a deferred approval in accordance with Titles 21 and 24 of the California Code of Regulations, shall take precedence over any previously issued addenda, drawing or specification.
- f. **Organization of Contract Documents.** Organization of the Contract Documents 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. CONTRACTS DOCUMENTS: COPIES & MAINTENANCE

Contractor will be furnished, free of charge, at least one (1) copy of the Contract Documents (i.e., plans and specs). Additional copies may be obtained at cost of reproduction.

Contractor shall maintain a clean, undamaged set of Contract Documents at the Project Site.

ARTICLE 4. DETAIL DRAWINGS AND INSTRUCTIONS

- a. **Examination of Contract Documents.** Before commencing any portion of The Work, Contractor shall again carefully examine all applicable Contract Documents, the Project Site and other information given to Contractor as to materials and methods of construction and other Project requirements. Contractor shall immediately notify the District Representative of any potential error, inconsistency, ambiguity, conflict or lack of detail or explanation. If Contractor performs, permits, or causes the performance of any Work 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. In no case shall the Contractor or any subcontractor proceed with Work if uncertain as to the applicable requirements.

- b. **Additional Instructions.** After notification of any error, inconsistency, ambiguity, conflict or lack of detail or explanation, the District Representative will provide any required additional instructions, by means of drawings or other written direction, necessary for proper execution of Work.
- c. **Quality of Parts, Construction and Finish.** All parts of The Work shall be of the best quality of their respective kinds and the Contractor must use all diligence to inform itself fully as to the required construction and finish. In no case shall Contractor proceed with The Work without obtaining first from the District Representative such Approval may be necessary for the proper performance of Work.
- d. **Contractor's Variation from Contract Document Requirements.** If it is found that the Contractor has varied from the requirements of the Contract Documents including the requirement to comply with all applicable laws, ordinances, rules and regulations, the District Representative may at any time, before or after completion of the Work, order the improper Work removed, remade or replaced by the Contractor at the Contractor's expense.

ARTICLE 5. EXISTENCE OF UTILITIES AT THE WORK SITE

- a. The District has endeavored to determine the existence of utilities at the Project Site from the records of the owners of known utilities in the vicinity of the Project. 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 its own investigations, including but not limited to calling Underground Service Alert and 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 District in writing of any utility discovered in a different position than shown on the Plans or which is not shown on the Plans.
- c. All water meters, water valves, fire hydrants, electrical utility vaults, telephone vaults, gas utility valves, and other subsurface structures shall be relocated or adjusted to final grade by the Contractor. Locations of existing utilities shown on the Plans are approximate and may not be complete. The Contractor shall be responsible for coordinating its Work with all utility companies during the construction of The Work.
- d. **Main or Trunkline Facilities**
 - i. Notwithstanding the above, pursuant to Section 4215 of the Government Code, as it may be amended from time to time, the District has the responsibility to identify, with reasonable accuracy, main or trunkline facilities on the plans and specifications.

In the event that main or trunkline utility facilities are not identified with reasonable accuracy in the plans and specifications made a part of the invitation for bids, District shall assume the responsibility for their timely removal, relocation, or protection. ii.

The Contractor shall be compensated by the District 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 trunkline utility facilities not indicated with reasonable accuracy in the plans and specifications, and for equipment in the Project necessarily idled during such work.

iii. Alternatively, District may make changes in the alignment and grade of the work to obviate the necessity to remove, relocate, or temporarily maintain the utility, or District may make arrangements with the owner of the utility for such work to be done at no cost to the Contractor.

iv. 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 District or the owner of the utility to provide for the removal, relocation, protection or temporary maintenance of all such main or trunkline facilities not indicated with reasonable accuracy.

v. Nothing herein shall preclude the District from pursuing any appropriate remedy against the utility for delays which are the responsibility of the utility.

vi. 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.

vii. If the Contractor while performing the Contract discovers utility facilities not identified by the District in the Contract plans or specifications, he shall immediately notify the District and utility in writing.

viii. 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.

e. **Other Utilities.** 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 District 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 the provisions herein 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 the provisions 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. 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 6. PROJECT SCHEDULE

- a. **Estimated Schedule.** Unless otherwise directed in the Technical Specifications or Special Conditions, within ten (10) days after the issuance of the Notice to Proceed, Contractor shall prepare a Project schedule and shall submit this to the District Representative for Approval. The receipt or Approval of any schedules by the District Representative or the District shall not in any way relieve the Contractor of its obligations under the Contract Documents. 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. 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. If the required schedule is not received by the time the first payment under the Contract is due, Contractor shall not be paid until the schedule is received, reviewed and accepted by the District Representative.

- b. **Schedule Contents.** The schedule shall allow enough time for normal inclement weather, based on the total time period during which The Work will be ongoing and local climatological averages for the Project Site during that entire time period. The District may specify in the Special Conditions the minimum number of inclement weather days which must be included in the Project schedule. The schedule shall indicate the beginning and completion dates of all phases of construction; critical path for all critical, sequential time related activities; and “float time” for all “slack” or “gaps” in the non-critical activities. 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. Schedule duration shall match the Contract time. If the Work fails to meet the milestones stated in the Schedule, at any time, the Contractor shall submit to the District within forty-eight (48) hours, an explanation in writing as to why the Schedule is not being maintained as well as a recovery schedule indicating how the Contractor will make up the delay and get the Project back on Schedule. Schedules indicating early completion will be rejected.
- c. **Schedule Updates.** Contractor shall continuously update its construction schedule. Contractor shall submit an updated and accurate construction schedule to the District Representative whenever requested to do so by District Representative and with each progress payment request. If The District Representative may withhold progress payments or other amounts due under the Contract Documents if Contractor fails to submit an updated and accurate construction schedule (including failure to provide a recovery schedule when required).
- d. **Conflicts with Testing and/or School Functions.** In no event shall the Contractor conduct any work on the Project on dates on which testing of students is conducted and/or there is a school function which might be impacted by the Contractor’s operations on Site. The District or District’s representative will provide the Contractor with a schedule of test dates and/or school functions concurrent with the issuance of the notice to proceed for the Contract so that such events can be incorporated into the schedule.

ARTICLE 7. SUBSTITUTIONS

- a. Pursuant to Public Contract Code Section 3400(b) the District 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.
- b. Unless specifically designated in the Contract Documents, whenever 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 the 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 in the Contract Documents. However,

the District may have adopted certain uniform standards for certain materials, processes and articles.

- c. Unless otherwise specified in the Special Conditions, Contractor shall submit requests, together with substantiating data, for substitution of any “or equal” material, process or article no later than thirty-five (35) days after award of the Contract. To facilitate the construction schedule and sequencing, some requests may need to be submitted before thirty-five (35) days after award of Contract. Provisions regarding submission of “or equal” requests shall not in any way authorize an extension of time for performance of this Contract. If a proposed “or equal” substitution request is rejected, Contractor shall be responsible for providing the specified material, process or article. The burden of proof as to the equality of any material, process or article shall rest with the Contractor. The District 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.
- d. Data required to substantiate requests for substitutions of an “or equal” material, process or article data shall include a signed affidavit from the Contractor stating that, and describing how, the substituted “or equal” material, process or article is equivalent to that specified in every way except as listed on the affidavit. Substantiating data shall include any and all illustrations, specifications, and other relevant data including catalog 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. 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 required substantiating data, including the signed affidavit, to the District in a timely fashion will result in the rejection of the proposed substitution.
- e. The Contractor shall bear all of the District’s costs associated with the review of substitution requests.
- f. The Contractor shall be responsible for all costs related to a substituted “or equal” material, process or article.
- g. Contractor is directed to the Special Conditions (if any) to review any findings made pursuant to Public Contract Code section 3400.

ARTICLE 8. SHOP DRAWINGS

- a. Contractor shall check and verify all field measurements and shall submit with such promptness as to provide adequate time for review and cause no delay in his own Work or in that of any other contractor, subcontractor, or worker on the Project, six (6) copies of all shop or setting drawings, calculations, schedules, and materials list, and all other provisions required by the Contract. Contractor shall sign all submittals affirming that submittals have been reviewed and approved by Contractor prior to submission to District Representative. 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 make any corrections required by the District Representative, and file with the District Representative six (6) corrected copies each, and furnish such other copies as may be needed for completion of the Work. District Representative's approval of shop drawings shall not relieve Contractor from responsibility for deviations from the Contract Documents unless Contractor has, in writing, called District Representative's attention to such deviations at time of submission and has secured the District Representative's written Approval. District Representative's Approval of shop drawings shall not relieve Contractor from responsibility for errors in shop drawings.

ARTICLE 9. SUBMITTALS

- a. Contractor shall furnish to the District Representative for approval, prior to purchasing or commencing any Work, a log of all samples, material lists and certifications, mix designs, schedules, and other submittals, as required in the specifications. The log shall indicate whether samples will be provided in accordance with other provisions of this Contract.
- b. Contractor will provide a minimum of two (2) sets of samples and submittals, together with catalogs and supporting data required by the District Representative, to the District Representative within a reasonable time period to provide for adequate review and avoid delays in the Work.
- c. These requirements shall not authorize any extension of time for performance of this Contract. District Representative will check and approve such samples, but 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 and submittals.
- d. If the District Representative's response results in a change in the Project, then such change shall be effected by a written change order.

ARTICLE 10. MATERIALS

- a. Except as otherwise specifically stated in the Contract Documents, 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 ensure uninterrupted progress of The Work and shall be stored properly and protected as required by the Contract Documents. Contractor shall be entirely responsible for damage or loss by weather or other causes to materials or Work.
- 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 the seller or supplier. Contractor warrants good title to all material, supplies, and equipment installed or incorporated in the work and agrees upon completion of all work to deliver the Project, to the District free from any claims, liens, or charges.
- e. Materials shall be stored on the Project Site in such manner so as not to interfere with any operations of the District or any other third party or any other contractor performing work at the Site. On-Site storage space is limited. Contractor shall coordinate all material deliveries with District's Representative prior to delivery. Deliveries shall coincide closely with installation dates.
- f. Storage requirements must be reviewed and approved by the District's Representative. Materials may be stored only in those areas designated as storage areas by the District's Representative. Material stored on-Site without the approval of the District's Representative, or stored outside of designated areas, will be removed from Site and warehoused at the Contractor's expense. Contractor shall obtain a Professional Engineer's approval for loading limitations of stored material as required. Contractor will cooperate and move materials as may be required by the District's Representative, at no additional cost.
- g. Contractor shall maintain its storage area and shall keep its storage areas clean, safe and secure. All materials will be palletized and/or stored upon appropriate dunnage. Notwithstanding the assignment provisions of the Contract Documents, the District shall procure Builder's Risk insurance for the Project.
- h. Contractor shall be responsible for providing off-Site storage facilities for its own materials at its cost. The storage of materials and equipment at the Site shall be permitted only to the extent approved in advance by the District's Representative. District's Representative shall approve location of Contractor's items of plant and tools such as hoists, mixers, cutters, etc. in advance.
- i. The Contractor shall schedule all major deliveries through the District's Representative or such deliveries may be turned away from the Site. Deliveries must be made during normal working hours, 7:00 a.m. – 3:30 p.m., Monday through Friday. The District's Representative will not accept or unload any deliveries for Contractor. Contractor shall provide the District's Representative with a minimum of forty eight (48) hours notice of major deliveries to Project Site. The Contractor shall be responsible for any and all costs

resulting from deliveries made, or attempted to be made, during non-working or overtime hours.

- j. **Recyclable Waste Materials.** As required by applicable local waste reduction and recycling requirements, Contractor shall divert all Recyclable Waste Materials to appropriate recycling centers. Contractor will be required to submit weight tickets and written proof of diversion with its monthly progress payment requests. Contractor shall complete and execute any certification forms required by District or other applicable agencies to document Contractor's compliance with these diversion requirements. All costs incurred for these waste diversion efforts shall be the responsibility of the Contractor. Contractor shall make reasonable efforts to identify other waste materials which are recyclable or saleable but which are not subject to mandatory diversion prior to disposal, recycling, sale or other disposition, shall communicate the value thereof to the District Representative and request District instruction regarding disposition. In the event Contractor receives any income from the sale or recycling of such waste materials, the District may deduct payment in the actual amount of income from contract payments.

ARTICLE 11. CONTRACTOR'S SUPERVISION

Contractor shall continuously keep at the Project Site, a competent and experienced full-time Project superintendent approved by the District. Superintendent must be able to proficiently speak, read and write in English and shall be onsite whenever workers are present. Project superintendent shall represent Contractor in Contractor's absence and all directions given to the Project superintendent shall be as binding as if given to Contractor. Contractor shall continuously provide efficient supervision of the Project.

ARTICLE 12. WORKERS

- a. Contractor shall at all times enforce strict discipline and good order among its employees. Contractor shall not employ on the Project any unfit person or any one not skilled in the Work assigned to him or her.
- b. Any person in the employ of the Contractor whom the District may deem incompetent or unfit shall be dismissed from The Work and shall not be employed on this Project except with the written Approval of the District.

ARTICLE 13. FINGERPRINTING REQUIREMENTS

District shall determine the Fingerprinting requirements for the Project as set forth in the Special Conditions. The Project shall be governed by paragraph (a) or (b) below, depending on the Work involved in the Project.

a. Contracts For Construction, Reconstruction, Rehabilitation Or Repair Of A School Facility Involving More Than Limited Contact With Students.

If the District determines, based on the totality of the circumstances concerning the Project, that the Contractor and Contractor's employees are subject to the requirements of Education Code section 45125.2 pertaining to Contracts for Construction, Reconstruction, Rehabilitation or Repair of a School Facility because they will have contact other than limited contact with pupils, by execution of the Contract, the Contractor acknowledges that Contractor is entering into a contract for the construction, reconstruction, rehabilitation, or repair of a school facility where the Contractor and/or Contractor's employees will have more than limited contact with students and the services to be provided do not constitute an emergency or exceptional situation. In accordance with Education Code section 45125.2 the Contractor shall, at Contractor's own expense:

b. Contracts For Construction, Reconstruction Rehabilitation Or Repair Of A School Facility Involving Only Limited Contact With Students.

If the District determines based on the totality of the circumstances concerning the Project that the Contractor and Contractor's employees are subject to the requirements of Education Code section 45125.2 pertaining to Contracts for Construction, Reconstruction, Rehabilitation or Repair of a School Facility because they will have only limited contact with pupils, by execution of the Contract, the Contractor acknowledges that Contractor is entering into a contract for the construction, reconstruction, rehabilitation or repair of a school facility involving only limited contact with students. Accordingly, the parties agree that the following conditions apply to any work performed by the Contractor and/or Contractor's employees on a school site: (1) Contractor and/or Contractor's employees shall check in with the school office each day immediately upon arriving at the school site; (2) Contractor and/or Contractor's employees shall inform school office staff of their proposed activities and location at the school site; (3) Once at such location Contractor and/or Contractor's employees shall not change locations without contacting the school office; (4) Contractor and Contractor's employees shall not use student restroom facilities; and (5) If Contractor and/or Contractor's employees find themselves alone with a student, Contractor and Contractor's employees shall immediately contact the school office and request that a member of the school staff be assigned to the work location.

ARTICLE 14. CONTRACT SECURITY

Unless otherwise specified in Special 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 California 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 District will consider and accepting multiple sureties on such bonds.

ARTICLE 15. SUBCONTRACTORS

- a. Contractor agrees to bind every subcontractor to the terms of the Contract Documents as far as such terms are applicable to subcontractor's portion of The Work. Contractor shall be as fully responsible to the District for the acts and omissions of its subcontractors and of persons either directly or indirectly employed by its subcontractors, as Contractor is for acts and omissions of persons directly employed by Contractor. Nothing contained in these Contract Documents shall create any contractual relationship between any subcontractor and the District. The District shall be deemed to be the third party beneficiary of the contract between the Contractor and the subcontractor.
- b. The District reserves the right to approve all subcontractors. The District's Approval of any subcontractor under this Contract shall not in any way relieve Contractor of its obligations in the Contract Documents.
- c. Substitution or addition of subcontractors shall be permitted only as authorized by the Subletting and Subcontracting Fair Practices Act pursuant to California Public Contract Code section 4100 et seq.

ARTICLE 16. PERMITS AND LICENSES

Permits and licenses necessary for prosecution of The Work shall be secured and paid for by Contractor, unless otherwise specified in the Contract Documents.

- a. Contractor shall obtain and pay for all other permits and licenses required for The Work, including excavation permit and for plumbing, mechanical and electrical work and for operations in or over public streets or right of way under jurisdiction of public agencies other than the District, all applicable environmental permits, approvals, and certifications including but not limited to certifications required by the United States Environmental Protection Agency's Lead Renovation, Repair, and Painting rule set forth at Title 40, Part 745 of the Code of Federal Regulations.
- b. The Contractor shall arrange and pay for all off-site inspection of the Work related to permits and licenses, including certification, required by the specifications, drawings, or by governing authorities, except for such off-site inspections delineated as the District's responsibility pursuant to the Contract Documents.

- c. Before Acceptance of the Project, the Contractor shall submit all licenses, permits, certificates of inspection and required approvals to the District.

ARTICLE 17. UTILITY USAGE

- a. All temporary utilities, including but not limited to electricity, water, gas, and telephone, used on the Work shall be furnished and paid for by Contractor. Contractor shall Provide necessary temporary distribution systems, including meters, if necessary, from distribution points to points on The Work where the utility is needed. Upon completion of The 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 Project Acceptance.
- d. If the Contract is for construction in existing facilities, Contractor may, with prior written Approval of the District, use the District's existing utilities by compensating the District for utilities used by Contractor.
- e. Refer to Specification Section 01500 Construction Facilities and Temporary Controls of the Contract Documents for further information.

ARTICLE 18. 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 District. 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 District. Contractor may either request reimbursement from the District for such fees, or shall be responsible for arranging and coordination with District for the payment of such fees.

ARTICLE 19. TRENCHES

- a. Trenches Five Feet or More in Depth. The Contractor shall submit to the District, 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. If the plan varies from shoring system standards, the plan shall be prepared by a registered civil or structural engineer. The plan shall not be less effective than the shoring, bracing, sloping, or other provisions of the Construction Safety Orders, as defined in the California Code of Regulations.
- 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 District, 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.

The District 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 Documents.

In the event that a dispute arises between the District 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 20. REMOVAL OF HAZARDOUS MATERIALS

Should Contractor encounter material reasonably believed to be polychlorinated biphenyl (PCB) or other toxic wastes and hazardous materials which have not been rendered harmless at the Project Site, the Contractor shall immediately stop work at the affected Project Site and shall report the condition to the District in writing. The District shall contract for any services required to directly remove and/or abate PCBs and other toxic wastes and hazardous materials, if required by the Project Site(s), and shall not require the Contractor to subcontract for such services. The Work in the affected area shall not thereafter be resumed except by written agreement of the District and Contractor.

ARTICLE 21. SANITARY FACILITIES

Contractor shall provide sanitary temporary toilet buildings for the use of all workers. All toilets shall comply with local codes and ordinances. Toilets shall be kept supplied with toilet paper, hand sanitizers and shall have workable door fasteners. Hand-wash stations shall also be provided and maintained accordingly. 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 toilets shall be maintained in a sanitary condition at all times. Use of toilet facilities in The Work under construction shall not be permitted. Any other Sanitary Facilities required by CAL-OSHA shall be the responsibility of the Contractor.

ARTICLE 22. AIR POLLUTION CONTROL

Contractor shall comply with all air pollution control rules, regulations, ordinances and statutes. All containers of paint, thinner, curing compound, solvent or liquid asphalt shall be labeled to indicate that the contents fully comply with the applicable material requirements. Without limiting the foregoing, Contractor must fully comply with all Applicable Laws, rules and regulations in furnishing or using equipment and/ or providing services, including but not limited to, emissions limits and permitting requirements imposed by the Air Quality Management District with jurisdiction over the Project and/ or California Air Resources Board (CARB). Contractor shall specifically be aware of the application of these limits and requirements to “portable equipment” which definition is considered to include any item of equipment with a fuel-powered engine. Contractor shall indemnify District against any fines or penalties imposed by the air quality management district, CARB, or any other governmental or regulatory agency for its violations of Applicable laws as well as those of its subcontractors or others for whom Contractor is responsible under its indemnity obligations provided for herein.

ARTICLE 23. COMPLIANCE WITH STATE STORM WATER PERMIT

- a. Contractor shall be required to comply with all aspects of the State Water Resources Control Board (State Water Board) Water Quality Order No. 2009-0009-DWQ, National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity (Permit) for all projects that involve construction on or disturbance of one acre or more of land or which are part of a larger common area of development.
- b. Contractor shall be responsible for filing the Notice of Intent (NOI) and for obtaining coverage under the Permit. This includes preparing and implementing a Storm Water Pollution Prevention Plan (SWPPP) for the Project site. Before any NOI, SWPPP, or other Permit related document may be submitted to the State Water Board or implemented on the Project site it must first be reviewed and approved by the District. Contractor shall include all costs of compliance with specified requirements in the Contract amount.
- c. The District retains the right to procure coverage under the Permit for the Project site if the Contractor fails to draft a satisfactory NOI or SWPPP or proceed in a manner that is satisfactory to the District. Any costs incurred by the District in procuring coverage under the Permit, or drafting an NOI or SWPPP shall be paid by the Contractor.
- d. Contractor shall be responsible for maintaining compliance with all aspects of the Permit during the course of the Project. Contractor shall provide copies of all reports and monitoring information to the District Representative. If the Contractor has failed or is

unable to maintain compliance with the Permit, the District reserves the right to implement its own SWPPP at the Project site, and hire additional contractors to maintain compliance. Whether Contractor has adequately maintained compliance with the Permit shall be the District's sole determination. Any costs incurred by the District in drafting and implementing a SWPPP, or otherwise maintaining compliance with the Construction General Permit shall be paid by the Contractor.

- e. In bidding on this Contract, it shall be Contractor's responsibility to evaluate and include in the contract amount the cost of procuring coverage under the Permit, preparing a SWPPP that is acceptable to the District, and complying with the SWPPP and any revisions to the SWPPP that become necessary during the course of construction.
- f. In addition to compliance with the Permit, Contractor shall comply with the lawful requirements of any applicable municipality, the District, drainage district, and other local agencies regarding discharges of storm water to the storm drain system or other watercourses under their jurisdiction, including applicable requirements in municipal storm water management programs.
- g. Storm, surface, nuisance, or other waters may be encountered at various times during construction of the Work. The Contractor, by submitting a Bid, hereby acknowledges that it has investigated the risk arising from such waters, has prepared its Bid accordingly, and assumes any and all risks and liabilities arising therefrom.
- h. Failure to comply with the Permit is a violation of federal and state law. Contractor hereby agrees to indemnify and hold harmless District, its officials, officers, agents, employees and authorized volunteers from and against any and all claims, demands, losses or liabilities of any kind or nature which District, its officials, 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 District, its officials, officers, agents, employees or authorized volunteers. District may seek damages from Contractor for delay in completing the Contract in accordance with the Contract Documents, caused by Contractor's failure to comply with the Permit.

ARTICLE 24. CLEANING UP

- a. Contractor at all times shall keep premises free from debris such as waste, rubbish, and excess materials and equipment. Contractor shall not store 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, window sills 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. Contractor shall fully clean up the Site at the completion of The Work. If the Contractor fails to immediately clean up at the completion of The Work, the District may do so and the cost of such clean up shall be charged back to the Contractor.

ARTICLE 25. LAYOUT AND FIELD ENGINEERING

All field engineering required for laying out The Work and establishing grades for earthwork operations shall be furnished by the Contractor at its expense. Layout shall be done by a registered civil engineer Approved by the District Representative. Any required “as-built” drawings of the Work shall be prepared by the registered civil engineer.

ARTICLE 26. EXCESSIVE NOISE

- a. The Contractor shall use only such equipment on the work and in such state of repair so that the emission of sound therefrom is within the noise tolerance level of that equipment as established by CAL-OSHA.
- b. The Contractor shall comply with the most restrictive of the following: (1) local sound control and noise level rules, regulations and ordinances and (2) the requirements contained in these Contract Documents, including hours of operation requirements. No internal combustion engine shall be operated on the Project without a muffler of the type recommended by the manufacturer. Should any muffler or other control device sustain damage or be determined to be ineffective or defective, the Contractor shall promptly remove the equipment and shall not return said equipment to the job until the device is repaired or replaced. Said noise and vibration level requirements shall apply to all equipment on the job or related to the job, including but not limited to, trucks, transit mixers or transit equipment that may or may not be owned by the Contractor.

ARTICLE 27. TESTS AND INSPECTIONS

- a. If the Contract Documents, the District Representative, or any instructions, laws, ordinances, or public authority require any part of The Work to be tested or Approved, Contractor shall provide the District Representative at least two (2) working days notice of its readiness for observation or inspection. If inspection is by a public authority other than the District, Contractor shall promptly inform the District of the date fixed for such inspection. Required certificates of inspection (or similar) shall be secured by Contractor. Costs for District testing and District inspection shall be paid by the District. Costs of tests for Work found not to be in compliance shall be paid by the Contractor.

- b. If any Work is done or covered up without the required testing or approval, the Contractor shall uncover or deconstruct the Work, and the Work shall be redone after completion of the testing at the Contractor's cost in compliance with the Contract Documents.
- c. Where inspection and testing are to be conducted by an independent laboratory or agency, materials or samples of materials to be inspected or tested shall be selected by such laboratory or agency, or by the District, and not by Contractor. All tests or inspections of materials shall be made in accordance with the commonly recognized standards of national organizations.
- d. In advance of manufacture of materials to be supplied by Contractor which must be tested or inspected, Contractor shall notify the District so that the District may arrange for testing at the source of supply. Any materials which have not satisfactorily passed such testing and inspection shall not be incorporated into The Work.
- e. If the manufacture of materials to be inspected or tested will occur in a plant or location outside the geographic limits of District, the Contractor shall pay for any excessive or unusual costs associated with such testing or inspection, including but not limited to excessive travel time, standby time and required lodging.
- f. Reexamination of Work may be ordered by the District. If so ordered, Work must be uncovered or deconstructed by Contractor. If Work is found to be in accordance with the Contract Documents, the District shall pay the costs of reexamination and reconstruction. If such work is found not to be in accordance with the Contract Documents, Contractor shall pay all costs.

ARTICLE 28. PROTECTION OF WORK AND PROPERTY

- a. The Contractor shall be responsible for all damages to persons or property that occur as a result of The Work. Contractor shall be responsible for the proper care and protection of all materials delivered and Work performed until completion and final Acceptance by the District. All Work shall be solely at the Contractor's risk. Contractor shall adequately protect adjacent property from settlement or loss of lateral support as necessary. Contractor shall comply with all applicable safety laws and building codes to prevent accidents or injury to persons on, about, or adjacent to the Project Site where Work is being performed. Contractor shall erect and properly maintain at all times, as required by field 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 in the course of construction.
- b. In an emergency affecting safety of life or of work or of adjoining property, Contractor, without special instruction or authorization from the District Representative, is hereby permitted to act to prevent such threatened loss or injury; and Contractor shall so act, without appeal, if so authorized or instructed by the District Representative or the

District. Any compensation claimed by Contractor on account of emergency work shall be determined by and agreed upon by the District and the Contractor.

- 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, and other adjoining property and structures, and to avoid damage thereto, and Contractor shall repair any damage thereto caused by The Work operations. Contractor shall:
 - 1) Enclose working area with a substantial barricade, and 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 Project Site over a route designated by the District Representative.
 - 4) Provide any and all dust control required and follow the Applicable air quality regulations as appropriate. If the Contractor does not comply, the District shall have the immediate authority to provide dust control and deduct the cost from payments to the Contractor.
 - 5) Confine Contractor's apparatus, the storage of materials, and the operations of its workers to limits required by law, ordinances, permits, or directions of the District Representative. Contractor shall not unreasonably encumber the Project Site with its materials.
 - 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, at no cost to the District.

ARTICLE 29. CONTRACTORS MEANS AND METHODS

Contractor is solely responsible for the means and methods utilized to Perform The Work. In no case shall the Contractor's means and methods deviate from commonly used industry standards.

ARTICLE 30. AUTHORIZED REPRESENTATIVES

The District shall designate representatives, who shall have the right to be present at the Project Site at all times. The District may designate an inspector who shall have the right to observe all of the Contractor's Work. The inspector is not authorized to make changes in the Contract

Documents. The inspector shall not be responsible for the Contractor's failure to carry out The Work in accordance with the Contract Documents. Contractor shall provide safe and proper facilities for such access.

ARTICLE 31. PROHIBITION ON HARASSMENT

The District is committed to providing a campus and workplace free of sexual harassment and harassment based on factors such as race, color, religion, national origin, ancestry, age, medical condition, marital status, disability or veteran status. Harassment includes without limitation, verbal, physical or visual conduct which creates an intimidating, offensive or hostile environment such as racial slurs, ethnic jokes, posting of offensive statements, posters or cartoons or similar conduct.

The Contractor shall adopt and implement all appropriate and necessary policies prohibiting any form of discrimination in the workplace, including without limitation harassment on the basis of any classification protected under local, state or federal law, regulation or policy. The Contractor shall take all reasonable steps to prevent harassment from occurring, including without limitation affirmatively raising the subject of harassment among its employees, expressing strong disapproval of any form of harassment, developing appropriate sanctions, informing employees of their right to raise and how to raise the issue of harassment and informing complainants of the outcome of an investigation into a harassment claim. The Contractor shall require that any subcontractor performing any portion of the work on the Project to adopt and implement policies in conformity with this Article.

The Contractor shall not permit any person, whether employed by the Contractor, a subcontractor, sub-subcontractor, or any other person or entity, performing any work on the Project at or about the Site to engage in any prohibited form of harassment. Any such person engaging in a prohibited form of harassment directed to any individual performing or providing any portion of The Work at or about the Site shall be subject to appropriate sanctions in accordance with the Contractor's anti-harassment policy adopted and implemented pursuant to this Article. Any person performing or providing work on the Project on or about the Site who engages in a prohibited form of harassment directed to any student, faculty member or staff of the District or directed to any other person on or about the Site shall be subject to immediate removal and shall be prohibited thereafter from providing or performing any portion of The Work on the Project.

ARTICLE 32. 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 District, twenty-five dollars (\$25) for each worker employed in the execution of Work by the Contractor or any subcontractor for each day during which such worker is required or permitted to work more than eight (8) hours in any one day and forty (40) hours in any week in violation of the provisions of the Labor Code, and in particular, Section 1810 to Section 1815, except that work may be 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. Work 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., unless specifically approved in writing by the District Representative.
- c. It shall be unlawful for any person to operate, permit, use, or cause to operate any of the following at the Project Site, other than between the hours of 7:00 a.m. to 5:00 p.m., Monday through Friday, with no Work allowed on District-observed holidays, unless otherwise specifically approved in writing by the District Representative:
 - 1) Powered Vehicles
 - 2) Construction Equipment
 - 3) Loading and Unloading Vehicles
 - 4) Domestic Power Tool.

ARTICLE 33. PAYROLL RECORDS

- a. Pursuant to Labor Code Section 1776, 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 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. In accordance with Labor Code section 1771.4, the Contractor and each subcontractor shall furnish the certified payroll records directly to the Department of Industrial Relations (“DIR”) on a weekly basis and in the format prescribed by the DIR, which may include electronic submission. Contractor shall comply with all requirements and regulations from the DIR relating to labor compliance monitoring and enforcement.
- c. The payroll records described herein shall be certified and submitted by the Contractor at a time designated by the District. 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 described herein shall be made available for inspection or furnished upon request of the DIR.

- d. Unless submitted electronically, 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.
- e. 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 shall not be marked or obliterated.
- f. 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 any 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 District, forfeit One Hundred Dollars (\$100.00) for each 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 34. 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 District. 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 District, its elected officials, officers, employees and agents free and harmless from any claims, liabilities, costs, penalties or interest arising out of any failure or allege failure to comply with the Prevailing Wage Laws.
- b. The Contractor and each subcontractor shall forfeit as a penalty to the District not more than Two Hundred Dollars (\$200.00) 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. Contractor shall post, at appropriate conspicuous points on the Project Site, a schedule showing all determined general prevailing wage rates and all authorized deductions, if any, from unpaid wages actually earned.
- d. As a further material part of this Contract, Contractor agrees to hold harmless and indemnify the District, 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 District 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 District and the other indemnified parties may appoint their own independent counsel, and Contractor agrees to pay all attorneys' fees and defense costs of the District and the other indemnified parties as billed, in addition to all other damages, fines, penalties and losses incurred by the District and the other indemnified parties as a result of the action.

ARTICLE 35. PUBLIC WORKS CONTRACTOR REGISTRATION

Pursuant to Labor Code sections 1725.5 and 1771.1, the Contractor and its subcontractors must be registered with the Department of Industrial Relations prior to the execution of a contract to perform public works. By entering into this Contract, Contractor represents that it is aware of the registration requirement and is currently registered with the DIR. Contractor shall maintain a current registration for the duration of the Project. Contractor shall further include the requirements of Labor Code sections 1725.5 and 1771.1 in any subcontract and ensure that all subcontractors are registered at the time this Contract is entered into and maintain registration for the duration of the Project.

ARTICLE 36. EMPLOYMENT OF APPRENTICES

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. 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. Information relative to apprenticeship standards, wage schedules, and other requirements may be obtained from the Director of Industrial Relations, the Administrator of Apprenticeships, San Francisco, California, or from the Division of Apprenticeship Standards and its branch offices. 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 37. NONDISCRIMINATION/EQUAL EMPLOYMENT OPPORTUNITY

Pursuant to Labor Code Section 1735 and other applicable provisions of law, the Contractor and its subcontractors shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, age, political affiliation, marital status, or

handicap on this Project. The Contractor will take affirmative action to insure that employees are treated during employment or training without regard to their race, color, religion, sex, national origin, age, political affiliation, marital status, or handicap.

ARTICLE 38. DEBARMENT OF CONTRACTORS AND SUBCONTRACTORS

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 Labor Code Section 1777.1 or 1777.7. 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 contractor on the project shall be returned to the District. 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 39. 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 U.S.C. § 651 et seq.), and California Code of Regulations, Title 8, Industrial Relations Division 1, Department of Industrial Relations, Chapter 4.

ARTICLE 40. 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 Project Site, and, in case any of sublet Work, the Contractor shall require the subcontractor similarly to provide workers' compensation insurance for all the latter's employees as prescribed by State law. 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 Project Site, 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 District certificates of his insurance protecting workers. Company or companies providing insurance coverage shall be acceptable to the District, if in the form and coverage as set forth in the Contract Documents. Contractor shall provide a Waiver of Subrogation in favor of the District and its parties.

ARTICLE 41. EMPLOYER'S LIABILITY INSURANCE

Contractor shall provide during the life of this Contract, Employer's Liability Insurance, including Occupational Disease, in the amount of, at least, one million dollars (\$1,000,000.00) per person per accident. Contractor shall provide District with a certificate of Employer's Liability Insurance. Such insurance shall comply with the provisions of the Contract Documents. The policy shall be endorsed, if applicable, to provide a Borrowed Servant/Alternate Employer Endorsement and contain a Waiver of Subrogation in favor of the District.

ARTICLE 42. COMMERCIAL GENERAL LIABILITY 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, Commercial General Liability insurance coverage, including but not limited to, premises liability, contractual liability, products/completed operations if applicable, personal and advertising injury – which may arise from or out of Contractor's operations, use, and management of the Project Site, or the performance of its obligations hereunder. Policy limits shall not be less than one million dollars (\$1,000,000.00) per occurrence for bodily injury, personal injury and property damage. If Commercial General Liability Insurance or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to this project/location or the general aggregate limit shall be twice the required occurrence limit.
- b. Such policy shall comply with all the requirements of the Contract Documents. The limits set forth herein 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 herein 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 District, and shall not preclude the District from taking such other actions available to the District under other provisions of the Contract Documents or law.
- c. 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 District harmless from any damage, loss, cost, or expense, including attorneys' fees, incurred by the District as a result thereof.
- d. Company or companies providing insurance coverage shall be acceptable to the District and authorized to conduct business in the State of California.
- e. All general liability policies provided pursuant to the provisions of this Article shall comply with the provisions of the Contract Documents.
- f. 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 these General Conditions, 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 District 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 the Contract Documents.

ARTICLE 43. AUTOMOBILE LIABILITY INSURANCE

Contractor shall take out and maintain at all times during the term of this Contract Automobile Liability Insurance in the amount of, at least, one million dollars (\$1,000,000). 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 District. Such policy shall comply with all the requirements of the Contract Documents. Company or companies providing insurance coverage shall be acceptable to the District and authorized to conduct business in the State of California.

ARTICLE 44. BUILDER'S RISK ["ALL RISK"]

- a. It is the Contractor's responsibility to maintain or cause to be maintained Builder's Risk ["All Risk"] extended coverage insurance on all work, material, equipment, appliances, tools, and structures which are a part of the Contract and subject to loss or damage by fire, and vandalism and malicious mischief, in an amount to cover 100% of the replacement cost. The District accepts no responsibility until the Contract is formally accepted by the Governing Board for the work. The Contractor is required to file with the District a certificate evidencing fire insurance coverage.
- b. Provide insurance coverage on completed value form, all-risk or special causes of loss coverage.
 - 1) Insurance policies shall be so conditioned as to cover the performance of any extra work performed under the Contract.
 - 2) Coverage shall include all materials stored on Site and in transit.
 - 3) Coverage shall include Contractor's tools and equipment.
 - 4) Insurance shall include boiler, machinery and material hoist coverage.

- c. Such insurance shall comply with all provisions of the Contract Documents.

ARTICLE 45. FORM AND PROOF OF CARRIAGE OF INSURANCE

- a. Any insurance carrier providing insurance coverage required by the Contract Documents shall be admitted to and authorized to do business in the State of California unless waived, in writing, by the District Risk Manager. Carrier(s) shall have an A.M. Best rating of not less than an A:VIII. Insurance deductibles or self-insured retentions must be declared by the Contractor, and such deductibles and retentions shall have the prior written consent from the District. At the election of the District the Contractor shall either: 1) reduce or eliminate such deductibles or self-insured retentions, or 2) procure a bond which guarantees payment of losses and related investigations, claims administration, and defense costs and expenses.
- b. Contractor shall cause its insurance carrier(s) to furnish the District with either 1) a properly executed original Certificate(s) of Insurance and certified original copies of Endorsements effecting coverage as required herein, or 2) if requested to do so in writing by the District Risk Manager, provide original Certified copies of policies including all Endorsements and all attachments thereto, showing such insurance is in full force and effect. The District, its Directors and officers, employees, agents or representatives shall be named as Additional Insureds on all policies of Commercial General Liability and Automobile Liability Insurance and Contractor shall provide a Waiver of Subrogation in favor of those parties. Further, said Certificate(s) and policies of insurance shall contain the covenant of the insurance carrier(s) that shall provide no less than thirty (30) days written notice be given to the District prior to any material modification or cancellation of such insurance. In the event of a material modification or cancellation of coverage, the District may terminate or Stop Work pursuant to the Contract Documents, unless the District receives, prior to such effective date, another properly executed original Certificate of Insurance and original copies of endorsements or certified original policies, including all endorsements and attachments thereto evidencing coverages set forth herein and the insurance required herein is in full force and effect. Contractor shall not take possession, or use the Project Site, or commence operations under this Agreement until the District has been furnished original Certificate(s) of Insurance and certified original copies of Endorsements or policies of insurance including all Endorsements and any and all other attachments as required in this Section. The original Endorsements for each policy and the Certificate of Insurance shall be signed by an individual authorized by the insurance carrier to do so on its behalf.
- c. It is understood and agreed to by the parties hereto and the insurance company(s), that the Certificate(s) of Insurance and policies shall so covenant and shall be construed as primary, and the District's insurance and/or deductibles and/or self-insured retentions or self-insured programs shall not be construed as contributory.
- d. The District reserves the right to adjust the monetary limits of insurance coverage's during the term of this Contract including any extension thereof-if in the District's

reasonable judgment, the amount or type of insurance carried by the Contractor becomes inadequate.

- e. Contractor shall pass down the insurance obligations contained herein to all tiers of sub-contractors working under this Contract.

ARTICLE 46. TIME FOR COMPLETION AND LIQUIDATED DAMAGES

- a. **Time for Completion/Liquidated Damages.** Work shall be commenced within ten (10) days of the date stated in the District's Notice to Proceed and shall be completed by Contractor in the time specified in the Contract Documents. The District is under no obligation to consider early completion of the Project; and the Contract completion date shall not be amended by the District's receipt or acceptance of the Contractor's proposed earlier completion date. Furthermore, Contractor shall not, under any circumstances, receive additional compensation from the District (including but not limited to indirect, general, administrative or other forms of overhead costs) for the period between the time of earlier completion proposed by the Contractor and the Contract completion date. If The Work is not completed as stated in the Contract Documents, it is understood that the District will suffer damage. In accordance with Government Code section 53069.85, being impractical and infeasible to determine the amount of actual damage, it is agreed that Contractor shall pay to the District as fixed and liquidated damages, and not as a penalty, the sum stipulated in the Contract for each day of delay until The Work is fully completed. Contractor and its surety shall be liable for any liquidated damages. Any money due or to become due the Contractor may be retained to cover liquidated damages.
- b. **Inclement Weather.** If adverse weather conditions are the basis for a request for an extension of time, the Contractor must document the claim in writing and submit it to the District Representative within five (5) days of the cited weather conditions, with data substantiating that weather conditions were abnormal as compared to the average historical climate conditions based on the preceding ten year records published by the National Oceanic and Atmospheric Administration ("NOAA") entitled "Local Climatological Data" for the period of time. Time extensions for inclement weather shall only be granted when the Work stopped during inclement weather is on the critical path of the Project schedule. Where causes of delays are unusually severe weather as described herein, any time extension will be considered to be excusable, however it shall not be compensable, including any 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 Contractor is responsible for all costs associated with such delay. The sole remedy of the Contractor for such inclement weather shall be the grant of a time extension directly related to the delay. Contractor shall abide the District Representative's determination of what constitutes excusable inclement weather pursuant to this section. Refer to Specification Section 01360 Construction Schedule for inclement weather related delays and extensions.

- c. **Extension of Time.** Contractor shall not be charged liquidated damages because of any delays in completion of The Work due to unforeseeable causes beyond the control and without the fault or negligence of Contractor (or its subcontractors or suppliers). Contractor shall within five (5) Days of identifying any such delay notify the District in writing of causes of delay. The District shall ascertain the facts and extent of delay and grant extension of time for completing The Work when, in its judgment, the facts justify such an extension. Time extensions to the Project shall be requested by the Contractor as they occur and without delay. No delay claims shall be permitted unless the event or occurrence delays the completion of the Project beyond the Contract completion date.
- d. **No Damages for Reasonable Delay.** The District's liability to Contractor for delays for which the District is responsible shall be limited to only an extension of time unless such delays were unreasonable under the circumstances. In no case shall the District be liable for any costs which are borne by the Contractor in the regular course of business, including, but not limited to, home office overhead and other ongoing costs. Damages caused by unreasonable District delay, including delays caused by items that are the responsibility of the District pursuant to Government Code section 4215, shall be based on actual costs only, no proportions or formulas shall be used to calculate any delay damages.

ARTICLE 47. COST BREAKDOWN AND PERIODIC ESTIMATES

Contractor shall furnish on forms Approved by the District:

- a. Within ten (10) Days of award of the Contract a detailed estimate giving a complete breakdown of the Contract price;
- b. A monthly itemized estimate of Work done for the purpose of making progress payments. In order for the District to consider and evaluate each progress payment application, the Contractor shall submit a detailed measurement of Work performed and a progress estimate of the value thereof before the tenth (10th) Day of the following month.
- c. Contractor shall submit, with each of its payment requests, an adjusted list of actual quantities, verified by the District Representative, for unit price items listed, if any, in the Bid Form.
- d. Following the District's Acceptance of the Work, the Contractor shall submit to the District a written statement of the final quantities of unit price items for inclusion in the final payment request.
- e. The District shall have the right to adjust any estimate of quantity and to subsequently correct any error made in any estimate for payment.

Contractor shall certify under penalty of perjury, that all cost breakdowns and periodic estimates accurately reflect the Work on the Project. Refer to Specification Section 01050 Schedule of Values for further information related to this Article.

ARTICLE 48. MOBILIZATION

- a. When a bid item is included in the Bid Form for mobilization, the costs of Work in advance of construction operations and not directly attributable to any specific bid item will be included in the progress estimate ("Initial Mobilization"). When no bid item is provided for "Initial Mobilization," payment for such costs will be deemed to be included in the other items of The Work.
- b. Payment for Initial Mobilization based on the lump sum provided in the Bid Form, which shall constitute full compensation for all such Work. No payment for Initial Mobilization will be made until all of the listed items have been completed to the satisfaction of the District Representative. The scope of the Work included under Initial Mobilization shall include, but shall not be limited to, the following principal items:
 1. Obtaining and paying for all bonds, insurance, and permits.
 2. Moving on to the Project Site of all Contractor's plant and equipment required for first month's operations.
 3. Installing temporary construction power, wiring, and lighting facilities.
 4. Establishing fire protection system.
 5. Developing and installing a construction water supply.
 6. Providing and maintaining the field office trailers for the Contractor and the District Representative, complete, with all specified furnishings and utility services including telephones, telephone appurtenances, computer and printer, and copying machine.
 7. Providing on-Site communication facilities for the Owner and the District Representative, including telephones, radio pagers, and fax machines.
 8. Providing on-Site sanitary facilities and potable water facilities as specified per Cal-OSHA and these Contract Documents.
 9. Furnishing, installing, and maintaining all storage buildings or sheds required for temporary storage of products, equipment, or materials that have not yet been installed in the Work. All such storage shall meet manufacturer's specified storage requirements, and the specific provisions of the specifications, including temperature and humidity control, if recommended by the manufacturer, and for all security.

10. Arranging for and erection of Contractor's work and storage yard.
11. Posting all OSHA required notices and establishment of safety programs per Cal-OSHA.
12. Full-time presence of Contractor's superintendent at the job Site as required herein.
13. Submittal of Construction Schedule as required by the Contract Documents.

ARTICLE 49. PAYMENTS

- a. The District shall make monthly progress payments following receipt of undisputed and properly submitted payment requests. Contractor shall be paid 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. Notwithstanding the foregoing, Contractor shall not be entitled to payment for work so long as any lawful or proper direction concerning the Work or any portion thereof given by the District, District's Representative, or the Architect shall remain uncomplied with.
- b. The Contractor shall, after the full completion of The Work, submit a final payment application. All prior progress estimates shall be subject to correction in the final estimate and payment.
- c. Unless otherwise required by law, the final payment of five percent (5%) of the value of the Work, if unencumbered, shall be paid no later than sixty (60) Days after the date of recordation of the Notice of Completion.
- d. Acceptance by Contractor of the final payment shall constitute a waiver of all claims against the District arising from this Contract.
- e. Payments to the Contractor shall not be construed to be an acceptance of any defective work or improper materials, or to relieve the Contractor of its obligations under the Contract Documents.
- f. The Contractor shall submit with each payment request the Contractor's conditional waiver of lien for the entire amount covered by such payment request, as well as a valid unconditional waiver of lien from the Contractor and all subcontractors and materialmen for all work and materials included in any prior invoices. Waivers of lien shall be in the forms prescribed by California Civil Code Section 8134. Prior to final payment by the District, the Contractor shall submit a final waiver of lien for the Contractor's work, together with releases of lien from any subcontractor or materialmen.
- g. Unless otherwise required by law, the final payment of five percent (5%) of the value of the Work, if unencumbered, shall be paid no later than sixty (60) days after the date of Completion, provided however, that in the event of a dispute between the District and the

Contractor, the District 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:

- i. 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.
 - ii. The acceptance by the public agency, or its agent, or the work of improvement.
 - iii. 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.
 - iv. 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.
- h. Prior to final payment, the Contractor shall submit a final waiver of lien for the Contractor's Work together with releases of lien from any of its subcontractor or materialmen, pursuant to Civil Code Section 8138. 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 District, which acceptance shall be by formal action of the District Board.
- i. No payment (final or otherwise) made under or in connection with this Agreement shall be conclusive evidence of the performance of the Work or of this Agreement, in whole or in part, and no such payment shall be construed to be an acceptance of defective, faulty or improper work or materials nor shall it release the Contractor from any of its obligations under this Agreement; nor shall entrance and use by the District constitute acceptance of the Work or any part thereof.
- j. For purposes of this Contract, the acceptance by the District means acceptance made only by an action of the governing body of the District in session. At any time after fifty percent (50%) of the work has been completed, if the District, by action of its governing body, finds that satisfactory progress is being made, the District 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 District may find appropriate based on the Contractor's progress.
- k. 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.

- l. Whenever any part of the work is in a condition suitable for use, and the best interest of the District requires such use, the District 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 District's expense. The use by the District 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 District of any of the conditions thereof. Contractor shall continue to maintain all insurance, including Builder's Risk insurance, on the Project.

ARTICLE 50. PAYMENTS WITHHELD AND BACK CHARGES

In addition to amounts which the District may retain under other provisions of the Contract Documents the District may withhold payments due to Contractor as may be necessary to cover:

- a. Stop Payment Notice Claims.
- b. Defective work not remedied.
- c. Failure of Contractor to make proper payments to its subcontractors or suppliers.
- d. Completion of the Contract if there exists a reasonable doubt that the work can be completed for balance then unpaid.
- e. Damage to another contractor or third party.
- f. Amounts which may be due the District for claims against Contractor.
- g. Failure of Contractor to keep the record ("as-built") drawings up to date. As-builts shall be updated weekly and available for review by the District or its Representative.
- h. Failure to provide updates on the construction schedule and/or a recovery schedule if required.
- i. Site clean up.
- j. Failure of the Contractor to comply with requirements of the Contract Documents, including but not limited to Contractor's failure to provide approved complete as-builts prior to filing of Notice of Completion.
- k. Liquidated damages.
- l. Legally permitted penalties.

The District may apply such withheld amount or amounts to payment of such claims or obligations at its discretion with the exception of subsections (a), (c) and (e) of this Article,

which must be retained or applied in accordance with applicable law. In so doing, the District shall be deemed the agent of Contractor and any payment so made by the Contractor shall be considered as a payment made under contract by the District to Contractor and the District shall not be liable to Contractor for such payments made in good faith. Such payments may be made without prior judicial determination of the claim or obligations. The District will render Contractor a proper accounting of such funds disbursed on behalf of the Contractor.

Upon completion of the Contract, the District will reduce the final Contract amount to reflect costs charged to the Contractor, back charges or payments withheld pursuant to the Contract Documents.

ARTICLE 51. CHANGES AND EXTRA WORK

- a. Owner Initiated Change. The District, without invalidating the Contract, may order changes in the Work consisting of additions, deletions or other revisions, the Contract amount and Contract time being adjusted accordingly. All such changes in the Work shall be authorized by written Change Order, and shall be performed under the applicable conditions of the Contract Documents. A Change Order signed by the Contractor indicates the Contractor's agreement therewith, including any adjustment in the Contract amount or the Contract time, and the full and final settlement of all costs (direct, indirect and overhead) related to the Work authorized by the Change Order.
 1. The Contractor must submit a complete cost proposal, including any change in the Contract time, within seven (7) Days after receipt of a scope of a proposed Change Order, unless the District requests that proposals be submitted in less than seven (7) Days.
- b. Contractor Initiated Change. The Contractor must give written notice to the District Representative of a proposed Change Order required for compliance with the Contract Documents within seven (7) Days of discovery of the facts giving rise to the proposed change order.
- c. Contract Price Adjustment.
 1. All claims for additional compensation to the Contractor shall be presented in writing before the expense is incurred and will be adjusted as provided herein. No Work shall be allowed to lag pending such adjustment, but shall be promptly executed as directed, even if a dispute arises. No claim will be considered after the Work in question has been done unless a written contract change order has been issued or a timely written notice of claim has been made by Contractor. Contractor shall not be entitled to claim or bring suit for damages, whether for loss of profits or otherwise, on account of any decrease or omission of any item or portion of Work to be done. Whenever any change is made as provided for herein, such change shall be considered and treated as though originally included

in the Contract, and shall be subject to all terms, conditions and provisions of the original Contract.

2. Whenever possible, any changes to the Contract amount shall be in a lump sum mutually agreed to by the Contractor and the District.
 3. All price quotations submitted by the Contractor shall be accompanied by sufficiently detailed supporting documentation to permit verification by the District.
- d. Force Account Work. If the Contractor fails to submit the cost proposal for a Change Order within the seven (7) Day period (or as requested), the District has the right to order the Contractor in writing to commence the Work immediately on a force account basis and/or issue a lump sum change to the Contract price in accordance with the District's estimate of cost. If the change is issued based on the District estimate, the Contractor will waive its right to dispute the action unless within fifteen (15) Days following completion of the added/deleted Work, the Contractor presents written proof that the District's estimate was in error.
- e. Cost Estimates. Estimates for lump sum quotations and accounting for cost-plus-percentage Work shall be limited to direct expenditures necessitated specifically by the subject extra work, and shall be segregated as follows:
- (a) Labor. The costs of labor will be the actual cost for wages prevailing locally for each craft or type of worker at the time the extra work is done, plus employer payments of payroll taxes and insurance, health and welfare, pension, vacation, apprenticeship funds, and other direct costs resulting from Federal, State or local laws, as well as assessment or benefits required by lawful collective bargaining agreements. The use of a labor classification which would increase the extra work cost will not be permitted unless the Contractor establishes the necessity for such additional costs. Labor costs for equipment operators and helpers shall be reported only when such costs are not included in the invoice for equipment rental.
 - (b) Materials. The cost of materials reported shall be at invoice or lowest current price at which such materials are locally available in the quantities involved, plus sales tax, freight and delivery. Materials cost shall be based upon supplier or manufacturer's invoice. If invoices or other satisfactory evidence of cost are not furnished within fifteen (15) Days of delivery, then the District Representative shall determine the materials cost, at its sole discretion.
 - (c) Tool and Equipment Use. No payment will be made for the use of small tools, tools which have a replacement value of \$1,000 or less. Regardless of ownership, the rates to be used in determining equipment use costs shall not exceed listed rates prevailing locally at equipment rental agencies, or distributors, at the time the Work is performed.

(d) Overhead, Profit and Other Charges. The mark-up for overhead (including supervision) and profit on Work added to the Contract shall be according to the following:

- i. “Net Cost” is defined as consisting of costs of labor, materials and tools and equipment only excluding overhead and profit. The costs of applicable insurance and bond premium will be reimbursed to the Contractor and subcontractors at cost only, without mark-up.
- ii. For Work performed by the Contractor’s forces the added cost for overhead and profit shall not exceed ten (10%) percent of the Net Cost of the Work.
- iii. For Work performed by a subcontractor, the added cost for overhead and profit shall not exceed ten (10%) percent of the Net Cost of the Work to which the Contractor may add five (5%) percent of the subcontractor’s Net Cost.
- iv. For Work performed by a sub-subcontractor the added cost for overhead and profit shall not exceed ten (10 %) percent of the Net Cost for Work to which the subcontractor and general Contractor may each add an additional five (5 %) percent of the Net Cost of the lower tier subcontractor.
- iv. No additional markup will be allowed for lower tier subcontractors, and in no case shall the added cost for overhead and profit payable by District exceed twenty (20%) percent of the Net Cost as defined herein.

(e) For added or deducted Work by subcontractors, the Contractor shall furnish to the District the subcontractor’s signed detailed estimate of the cost of labor, material and equipment, including the subcontractor markup for overhead and profit. The same requirement shall apply to sub-subcontractors.

(f) For added or deducted Work furnished by a vendor or supplier, the Contractor shall furnish to the District a detailed estimate or quotation of the cost to the Contractor, signed by such vendor or supplier.

(g) Any change in the Work involving both additions and deletions shall indicate a net total cost, including subcontracts and materials. Allowance for overhead and profit, as specified herein, shall be applied if the net total cost is an extra; overhead and profit allowances shall not be applied if the net total cost is a credit. The estimated cost of deductions shall be based on labor and material prices on the date the Contract was executed.

- (h) Contractor shall not reserve a right to assert impact costs, extended job site costs, extended overhead, constructive acceleration and/or actual acceleration beyond what is stated in the change order for Work. No claims shall be allowed for impact, extended overhead costs, constructive acceleration and/or actual acceleration due to a multiplicity of changes and/or clarifications. The Contractor may not change or modify the District's change order form in an attempt to reserve additional rights.
- f. Agreement as to Change in Contract Price/ Time. If the District disagrees with the proposal submitted by Contractor, it will notify the Contractor and the District will provide its opinion of the appropriate price and/or time extension. If the Contractor agrees with the District, a Change Order will be issued by the District. If no agreement can be reached, the District shall have the right to issue a unilateral change order setting forth its determination of the reasonable additions or savings in costs and time attributable to the extra or deleted work. Such determination shall become final and binding if the Contractor fails to submit a claim in writing to the District within fifteen (15) Days of the issuance of the unilateral change order, disputing the terms of the unilateral change order.
- g. No dispute, disagreement or failure of the parties to reach agreement on the terms of the change order shall relieve the Contractor from the obligation to proceed with performance of the Work, including extra work, promptly and expeditiously.
- h. Any alterations, extensions of time, extra work or any other changes may be made without securing consent of the Contractor's surety or sureties

ARTICLE 52. OCCUPANCY

The District reserves the right to occupy or utilize any portion of The Work at any time before completion, and such occupancy or use shall not constitute Acceptance of any part of Work covered by this Contract. This use shall not relieve the Contractor of its responsibilities under the Contract.

ARTICLE 53. INDEMNIFICATION

To the fullest extent allowed by law, Contractor shall defend (with counsel of District's choosing), indemnify and hold the District, its elected officials, officers, employees, agents and authorized volunteers free and harmless from any and all claims, demands, causes of action, costs, expenses, liabilities, losses, damages or injuries, at law or in equity, regardless of whether the allegations are false, fraudulent, or groundless, to property or persons, including wrongful death, to the extent arising out of or incident to any acts, omissions or willful misconduct of Contractor, its officials, officers, employees, agents, consultants and contractors arising out of or in connection with the performance of the Work or this Contract, including claims made by subcontractors for nonpayment, including without limitation the payment of all consequential damages and attorneys' fees and other related costs and expenses. Contractor shall defend, at Contractor's own cost, expense and risk, with counsel of District's choosing, any and all such aforesaid suits, actions or other legal proceedings of every kind that may be brought or instituted

against District, its elected officials, officers, employees, agents and authorized volunteers. To the extent of its liability, Contractor shall pay and satisfy any judgment, award or decree that may be rendered against District, its elected officials, officers, employees, agents and authorized volunteers in any such suit, action or other legal proceeding. Contractor shall reimburse District, its elected officials, officers, employees, agents and authorized volunteers for any and all legal expenses and costs incurred by each of them in connection therewith or in enforcing the indemnity herein provided. The only limitations on this provision shall be those imposed by Civil Code Section 2782.2.

ARTICLE 54. RECORD ("AS BUILT") DRAWINGS

- a. Contractor shall prepare and maintain a complete set of record drawings (herein referred to as "as-builts") and shall require each trade to prepare its own as-builts. 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. Contractor shall mark the as-builts 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 where shop drawings are used, Contractor must 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 as-builts into manageable sets, bound with durable paper cover sheets and shall print suitable title, dates and other identification on the cover of each set. Prior to filing of the Notice of Completion, complete as-builts for the Projects shall be turned over to the District's Representative. Contractor shall also provide an electronic version of the as-builts. The suitability of the as-builts will be determined by the District Representative. Final as-builts shall be signed-off by the District Engineer upon determination of suitability.
- c. Contractor shall update as-builts weekly and make them available for review by the District or the District's Representative.

ARTICLE 55. RESOLUTION OF CONSTRUCTION CLAIMS

- a. In accordance with Public Contract Code Sections 20104 *et seq.* and other applicable law, public works claims of \$375,000 or less which arise between the Contractor and the District shall be resolved under the following the statutory procedure unless the District has elected to resolve the dispute pursuant to Public Contract Code Section 10240 *et seq.*
- b. **All Claims.** All claims shall be submitted in writing and accompanied by substantiating documentation. Claims must be filed on or before the date of final payment unless other notice requirements are provided in the Contract Documents. "Claim" means a separate

demand by the claimant for (1) a time extension, (2) payment of money or damages arising from work done by or on behalf of the claimant and payment of which is not otherwise expressly provided for or the claimant is not otherwise entitled, or (3) an amount the payment of which is disputed by the District. The Contractor shall promptly comply with the Contract Documents in the performance of Work and/ or the requests of the District even though a written claim has been filed. The Contractor and the District shall make good faith efforts to resolve any and all claims that may arise during performance of the Work covered by this Contract.

- c. **Claims Under \$50,000.** The District shall respond in writing to the claim within 45 days of receipt of the claim, or, the District may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses or claims the District may have. If additional information is needed thereafter, it shall be provided upon mutual agreement of the District and the claimant. The District's written response shall be submitted 15 days after receiving the additional documentation, or within the same period of time taken by the claimant to produce the additional information, whichever is greater.
- d. **Claims over \$50,000 but less than or equal to \$375,000.** The District shall respond in writing within 60 days of receipt, or, may request in writing within 30 days of receipt of the claim, any additional documents supporting the claim or relating to defenses or claims the District may have against the claimant. If additional information is needed thereafter, it shall be provided pursuant to mutual agreement between the District and the claimant. The District's response shall be submitted within 30 days after receipt of the further documents, or within the same period of time taken by the claimant to produce the additional information or documents, whichever is greater. The Contractor shall make these records and documents available at all reasonable times, without any direct charge.
- e. The Contractor will submit the claim justification in the following format:
 - 1) Summary of claim merit and price, and Contract clause pursuant to which the claim is made.
 - 2) List of documents relating to claim
 - (a) Specifications
 - (b) Drawings
 - (c) Clarifications (Requests for Information)
 - (d) Schedules
 - (e) Other
 - 3) Chronology of events and correspondence

- 4) Analysis of claim merit
 - 5) Analysis of claim cost
 - 6) Analysis of time impact analysis in CPM format
 - 7) Cover letter and certification of validity of the claim
- f. If the claimant disputes the District's response, or if the District fails to respond within the statutory time period(s), the claimant may so notify the District within 15 days of the receipt of the response or the failure to respond, and demand an informal conference to meet and confer for settlement. Upon such demand, the District shall schedule a meet and confer conference within 30 Days.
 - g. If following the meet and confer conference, the claim or any portion thereof remains in dispute, the claimant may file a claim pursuant to Government Code 900 et seq. and Government Code 910 et seq. For purposes of those provisions, the time within which a claim must be filed shall be tolled from the time the claimant submits the written claim until the time the claim is denied, including any time utilized for the meet and confer conference.
 - h. Submission of a claim, properly certified, with all required supporting documentation, and written rejection or denial of all or part of the claim by District, is a condition precedent to any action, proceeding, litigation, suit, general conditions claim, or demand for arbitration by Contractor.

ARTICLE 56. DISTRICT'S RIGHT TO TERMINATE CONTRACT

- a. **Termination for Cause:** The District may, without prejudice to any other right or remedy, serve written notice upon Contractor of its intention to terminate this Contract if the Contractor: (i) refuses or fails to prosecute The Work or any part thereof with such diligence as will ensure its completion within the time required; (ii) fails to complete The Work within the required time; (iii) should file a bankruptcy petition or be adjudged a bankrupt; (iv) should make a general assignment for the benefit of its creditors; (v) should have a receiver appointed; (vi) should persistently or repeatedly refuse or fail to supply enough properly skilled workers or proper materials to complete the work; (vii) should fail to make prompt payment to subcontractors or for material or labor; (viii) persistently disregard laws, ordinances, other requirements or instructions of the District; (ix) should violate any of the provisions of the Contract Documents; or (x) otherwise be guilty of a substantial violation of any provision of the Contract.

The notice of intent to terminate shall contain the reasons for such intention to terminate. Unless within ten (10) Days after the service of such notice, such condition shall cease or satisfactory arrangements (acceptable to the District) for the required correction are made, this Contract shall be terminated. In such case, Contractor shall not be entitled to

receive any further payment until the Project has been finished. In event of any such termination, the District 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 District 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 District may take over and complete The Work by any method it may deem appropriate. Contractor and its surety shall be liable to the District for any excess costs or other damages incurred by the District to complete the Project. If the District takes over The Work, the District 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 Project Site. If the District takes over the work as herein above provided, the District 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 therefor.

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 District. Expense incurred by the District as herein provided, and damage incurred through Contractor's default, shall be certified by the District Representative.

- b. **Termination For Convenience:** The District may terminate performance of The Work in whole or, in part, if the District determines that a termination is in the District'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 District, the extent of termination, and the effective date of such termination.

After receipt of Notice of Termination, and except as directed by the District, 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 remaining portion of The Work.
 - 6) Submit to the District, within ten (10) Days from the effective date of the Notice of Termination, all of the 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 District'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 District no later than thirty (30) 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 District's Termination for Convenience."
 - 7) These provisions are in addition to and not in limitation of any other rights or remedies available to the District.
- c. Notwithstanding any other provision of this Article, when immediate action is necessary to protect life and safety or to reduce significant exposure or liability, the District may immediately order Contractor to cease Work on the Project until such safety or liability issues are addressed to the satisfaction of the District or the Contract is terminated.
- d. Should the District determine that environmental considerations mandate that the underlying Project should not go forward, District may notify Contractor that this Contract is terminated due to environmental considerations and District 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.
- e. 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 District exercises its right to terminate this Contract pursuant to this provision, the District 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.

- f. The foregoing provisions are in addition to and not in limitation of any other rights or remedies available to the District.
- 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 57. WARRANTY AND GUARANTEE

- a. Contractor warrants that all materials and equipment furnished under this Contract shall be new unless otherwise specified in the Contract Documents; and that all Work conforms to the Contract Document requirements and is free of any defect whether performed by the Contractor or any subcontractor or supplier.
- b. Unless otherwise stated, all warranty periods shall begin upon the filing of the Notice of Completion. Unless otherwise stated, the warranty period shall be for one year.
- c. The Contractor shall remedy at its expense any damage to District-owned or controlled real or personal property.
- d. Contractor shall furnish the District with all warranty and guarantee documents prior to final Acceptance of the Project by the District.
- e. The District shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect, or damage. The Contractor shall within ten (10) Days after being notified commence and perform with due diligence the repair or replacement of 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 without expense whatsoever to the District, ordinary wear and tear, unusual abuse or neglect excepted. If the Contractor fails to promptly remedy any defect, or damage; the District shall have the right to replace, repair, or otherwise remedy the defect, or damage at the Contractor's expense. Contractor hereby agrees to pay costs and charges therefore immediately on demand.
- f. 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 District, ordinary wear and tear, unusual abuse or neglect excepted. The District will give notice of observed defects with reasonable promptness. Contractor shall notify the District upon completion of repairs. In the event of failure of Contractor to comply with above-mentioned conditions within one week after being notified in writing, the District 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.

- g. In the event of any emergency constituting an immediate hazard to health, safety, property, or licensees, when caused by Work of the Contractor not in accordance with the Contract requirements, the District may undertake at Contractor's expense, and without prior notice, all Work necessary to correct such condition.
- h. With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for Work performed and Materials furnished under this Contract, the Contractor shall:
 - 1) Obtain for District all warranties that would be given in normal commercial practice;
 - 2) Require all warranties to be executed, in writing, for the benefit of the District; and
 - 3) Enforce all warranties for the benefit of the District, unless otherwise directed in writing by the District.

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.

This Article shall not limit the District's rights under this Contract or with respect to latent defects, gross mistakes, or fraud. The District specifically reserves all rights related to defective work, including but not limited to the defect claims pursuant to California Code of Civil Procedure Section 337.15.

ARTICLE 58. DOCUMENT RETENTION & EXAMINATION

- a. In accordance with Government Code Section 8546.7, records of both the District and the Contractor shall be subject to examination and audit by the State Auditor General for a period of three (3) years after final payment.
- b. Contractor shall make available to the District any of the Contractor's other documents related to the Project immediately upon request of the District.
- c. In addition to the State Auditor rights above, the District shall have the right to examine and audit all books, estimates, records, contracts, documents, bid documents, subcontracts, and other data of the Contractor (including computations and projections) related to negotiating, pricing, or performing the modification in order to evaluate the accuracy and completeness of the cost or pricing data at no additional cost to the District, for a period of four (4) years after final payment.

ARTICLE 59. SOILS INVESTIGATIONS

When a soils investigation report for the Project Site is available, such report shall not be a part of the Contract Documents. Any information obtained from such report as to subsurface soil

condition, or to elevations of existing grades or elevations of underlying rock, is approximate only and is not guaranteed. Contractor acknowledges that any soils investigation report (including any borings) was prepared for purposes of design only and Contractor is required to examine the Site before submitting its bid and must make whatever tests it deems appropriate to determine the underground condition of the soil.

ARTICLE 60. REQUIRED CERTIFICATIONS

Contractor shall, for all contracts involving state funds, submit a “Drug-Free Workplace Certification” and a “Recycled Content Certification.” These forms are included in the Contract Documents and must be signed under the penalty of perjury and dated prior to commencing work on this Project.

In addition to the above listed certifications, Contractor shall, for all contracts involving state funds, execute and submit an “Asbestos-Free Materials Certification.” Contractor, further, is aware of the following:

- a. Should asbestos containing materials be installed by the Contractor in violation of this certification, or if removal of asbestos containing materials is part of the Project, decontaminations and removals will be performed in accordance with the requirements of all applicable laws and will meet the following criteria:
 1. Decontamination and removal of work found to contain asbestos or work installed with asbestos containing equipment shall be done only under the supervision of a qualified consultant, knowledgeable in the field of asbestos abatement and accredited by the Environmental Protection Agency (EPA).
 2. The asbestos removal contractor shall be an EPA accredited contractor qualified in the removal of asbestos and shall be chosen and approved by the asbestos consultant who shall have sole discretion and final determination in this matter.
 3. The asbestos consultant shall be chosen and approved by the District which shall have sole discretion and final determination in this matter.
 4. The Work will not be accepted until asbestos contamination is reduced to levels deemed acceptable by the asbestos consultant.
- b. If removal of asbestos containing materials is part of the Project, the cost of all asbestos removal, including, but not necessarily limited to the cost of the asbestos removal contractor, the cost of the asbestos consultant, analytical and laboratory fees, time delays and additional costs that may be incurred by the District shall be borne entirely by the Contractor.
- c. Hold Harmless: Interface of Work for the Project with work containing asbestos shall be executed by the Contractor at his/her risk and at his/her discretion with full knowledge of

the currently accepted standards, hazards, risks and liabilities associated with asbestos work and asbestos containing products. By execution of the Contract, the Contractor acknowledges the above and agrees to the fullest extent permitted by law to hold harmless the District, its Governing Board, employees, agents, representatives, including its Architect and assigns, for all asbestos liability which may be associated with this work. The Contractor further agrees to instruct his/her employees with respect to the above-mentioned standards, hazards, risk and liabilities.

ARTICLE 61. SEPARATE CONTRACTS

- a. The District reserves the right to let other contracts in connection with this Work or on the Project Site. Contractor shall permit other contractors reasonable access and storage of their materials and execution of their work and shall properly connect and coordinate its Work with theirs.
- b. If any part of The Work depends for proper execution or results upon work of any other contractor, the Contractor shall inspect and promptly report to the District's Representative any defects in such work that renders it unsuitable for such proper execution and results. Contractor's failure to so inspect and report shall constitute its acceptance of the other contractor's work as fit and proper for reception of Contractor's Work, except as to defects which may develop in the other contractor's work after execution of Contractor's Work.
- c. To ensure proper execution of its subsequent Work, Contractor shall immediately inspect work already in place and shall at once report to the District Representative any problems with the work in place or discrepancies with the Contract Documents.
- d. Contractor shall ascertain to its own satisfaction the scope of the Project and nature of any other contracts that have been or may be awarded by the District 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 District 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 District 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 Site.

ARTICLE 62. NOTICE AND SERVICE THEREOF

All notices shall be in writing and shall be dated and signed by party giving such notice or by the duly authorized representative of such party, and shall be either served by personal delivery or

mailed to the other party as designated in the Bid Forms. Written notice to the Contractor shall be addressed to Contractor's principal place of business unless Contractor designates another address in writing for service of notice. Notice to District shall be addressed to the District as designated in the Notice Inviting Bids unless District designates another address in writing for service of notice. Notice shall be effective upon receipt or five (5) Days after being sent by first class mail, whichever is earlier. Notice given by facsimile shall not be effective unless acknowledged in writing by the receiving party.

ARTICLE 63. NOTICE OF THIRD PARTY CLAIMS

Pursuant to Public Contract Code Section 9201, the District shall provide Contractor with timely notification of the receipt of any third-party claim relating to the Contract.

ARTICLE 64. STATE LICENSE BOARD NOTICE.

Contractors are required by law to be licensed and regulated by the Contractors' State License Board which has jurisdiction to investigate complaints against contractors if a complaint regarding a patent act or omission is filed within four (4) years of the date of the alleged violation. A complaint regarding a latent act or omission pertaining to structural defects must be filed within ten (10) years of the date of the alleged violation. Any questions concerning a contractor may be referred to the Registrar, Contractors' State License Board, P.O. Box 26000, Sacramento, California 95826.

ARTICLE 65. INTEGRATION

- a. Oral Modifications Ineffective. No oral order, objection, direction, claim or notice by any party or person shall affect or modify any of the terms or obligations contained in the Contract Documents.
- b. Contract Documents Represent Entire Contract. The Contract Documents represent the entire agreement of the District and Contractor.

ARTICLE 66. 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 District. Any assignment without the written consent of the District 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 the Contract Documents 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 or the Government Code.

ARTICLE 67. 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 District in order that proper steps may be taken to have the change reflected on the Contract.

ARTICLE 68. 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 District 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 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 District makes final payment to the Contractor, without further acknowledgment by the parties.

ARTICLE 69. PROHIBITED INTERESTS

No District official or representative who is authorized in such capacity and on behalf of the District to negotiate, supervise, make, accept, or approve, or to take part in negotiating, supervising, making, accepting or approving any 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 the Contract.

ARTICLE 70. 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 District Representative 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 District Representative, he shall bear all costs arising therefrom.
- b. Contractor shall be responsible for familiarity with the Americans with Disabilities Act ("ADA") (42 U.S.C. § 12101 et seq.). The Work, including any installations of equipment and other devices, will be performed in compliance with ADA regulations.

ARTICLE 71. PATENT FEES OR ROYALTIES.

The Contractor shall include in its bid amount the patent fees or royalties on any patented article or process furnished or used in the Work. Contractor shall assume all liability and responsibility

arising from the use of any patented, or allegedly patented, materials, equipment, devices or processes used in or incorporated with The Work, and shall defend, indemnify and hold harmless the District, its officials, officers, agents, employees and representatives from and against any and all liabilities, demands, claims, damages, losses, costs and expenses, of whatsoever kind or nature, arising from such use.

ARTICLE 72. OWNERSHIP OF DRAWINGS

All Contract Documents furnished by the District are District property. They are not to be used by Contractor or any subcontractor on other work nor shall Contractor claim any right to such documents. With exception of one complete set of Contract Documents, all documents shall be returned to the District on request at completion of the Work.

ARTICLE 73. NOTICE OF TAXABLE POSSESSORY INTEREST

In accordance with Revenue and Taxation Code Section 107.6, the Contract Documents may create a possessory interest subject to personal property taxation for which Contractor will be responsible.

ARTICLE 74. DISTRICT'S INSPECTOR

- a. One or more inspectors employed by District 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.
- c. No work shall be covered or concealed until inspected by the District's Inspector.

- i. **INSPECTOR'S FIELD OFFICE**

- a. The Contractor shall be responsible for providing the inspector's field office. The office shall be of substantial waterproof construction with adequate natural light and ventilation by means of stock design windows. Door shall have a key-type lock or padlock hasp. The inspector's field office shall have heating and air-conditioning and shall be equipped with a telephone, a telephone answering machine, and a fax machine at contractor's expense.
- b. A table satisfactory for the study of plans and two chairs shall be provided by contractor. Contractor shall provide and pay for adequate electric lights, local telephone service, and adequate heat and air conditioning for the field office until authorized removal.
- c. The provisions of this section are intended to be complementary to any requirements provided elsewhere in these Contract Documents, however in the event of conflicts between this section and other provisions of these Contract Documents, this section shall prevail.

- ii **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.

ARTICLE 75. NO WAIVER

No provision of these Contract Documents shall be deemed waived by either party unless such waiver shall be expressly specified in writing, regardless of the actions or inaction of the parties.

DOCUMENT 00800

SPECIAL CONDITIONS

- A. **Liquidated Damages.** If work under this Contract is not ready for the intended use within the time period specified in the Contract, the agreed liquidated damages established in the General Conditions are as follows:

\$1,000.00 per calendar day; past project deadline

- B. **Substitutions.** All requests for Substitutions, submitted in accordance with the General Conditions and these Special Conditions of the Contract Documents shall be submitted using the "Request for Substitution" form included herein as a part of these Special Conditions, including the affidavit certifying that the proposed substitution is:

1. In full compliance with requirements of the Contract Documents and applicable code requirements;
2. Meets or exceeds the standard of quality of the item specified;
3. The same warranty will be provided as for the specified item; and
4. The Contractor waives all claims for additional costs or time that may result from use of an approved substitution.

The form shall be accompanied by complete technical data including drawings, performance specifications, samples, and test reports, and any other information as may be requested by the District Representative.

Substitution requests must be submitted using the "Request for Substitution" form no more than fourteen (14) calendar days prior to the date of bid opening. No Substitution will be allowed after bid opening unless approved by the District after Notice of Award.

The decision of the District Representative regarding any proposed substitution will be in writing, and the District Representative's decision shall be final. Should a proposed substitution be accepted, such acceptance shall not relieve the Contractor from complying with requirements of the Drawings and Specifications.

- C. **Fingerprinting.** Pursuant to the provisions of the General Conditions, the District determination of fingerprinting requirement application follows:

The Project shall be governed by paragraph (a) and (b) below.

- a. Contracts For Construction, Reconstruction, Rehabilitation Or Repair Of A School Facility Involving More Than Limited Contact With Students.

The District determines, based on the totality of the circumstances concerning the Project, that the Contractor and Contractor's employees are subject to the requirements of Education Code section 45125.2 pertaining to Contracts for Construction, Reconstruction, Rehabilitation or Repair of a School Facility because they will have contact other than limited contact with pupils, by execution of the Contract, the Contractor acknowledges that Contractor is entering into a contract for the construction, reconstruction, rehabilitation, or repair of a school facility where the Contractor and/or Contractor's employees will have more than limited contact with students and the services to be provided do not constitute an emergency or exceptional situation. In accordance with Education Code section 45125.2 the Contractor shall, at Contractor's own expense: (1) install a physical barrier, temporary construction fencing (TCF) to limit contact with students by Contractor and/or Contractor's employees;

b. Contracts For Construction, Reconstruction Rehabilitation Or Repair Of A School Facility Involving Only Limited Contact With Students.

The District determines based on the totality of the circumstances concerning the Project that the Contractor and Contractor's employees are subject to the requirements of Education Code section 45125.2 pertaining to Contracts for Construction, Reconstruction, Rehabilitation or Repair of a School Facility because they will have only limited contact with pupils, by execution of the Contract, the Contractor acknowledges that Contractor is entering into a contract for the construction, reconstruction, rehabilitation or repair of a school facility involving only limited contact with students. Accordingly, the parties agree that the following conditions apply to any work performed by the Contractor and/or Contractor's employees on a school site: (1) Contractor shall require its employees and/or sub-contractors and/or their employees to check in with the Job Superintendent each day immediately upon arriving at the school site; (2) Contractor and/or Contractor's employees shall remain inside the (TCF). If their work requires them to perform any duties outside of the (TCF) they shall schedule such work with the Job Superintendent (detailing estimated time and location of such work), who will inform the District's Project Construction Coordinator prior to any work performed outside the TCF; (3) Once at such location Contractor and/or Contractor's employees shall not change locations without notifying the Job Superintendent; (4) Contractor and Contractor's employees shall not use student restroom facilities; and (5) If Contractor and/or Contractor's employees find themselves alone with a student, Contractor and Contractor's employees shall immediately contact the Job Superintendent who will contact the school office and request that a member of the school staff be assigned to the work location.

- D. **Allowances.** Include the following allowance amounts in this bid. The following allowances will be used only at the discretion of the District. If additional work is requested by the District, the price for such work will be negotiated in accordance with the General Conditions. Allowance amounts not used by the District will be deducted from the contract amount by Change Order. Include allowance amount in bid.

PLANS AND DRAWING

SEE ATTACHED FOR SCOPE OF WORK

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GENERAL CONDITIONS

SECTION 011100
SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes:

- 1. Project information.
- 2. Work covered by Contract Documents.
- 3. Access to site.
- 4. Coordination with occupants.
- 5. Work restrictions.
- 6. Specification and drawing conventions.

- B. Related Sections:

- 1. Division 01 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

- A. Project Identification:

HVAC Improvements at Madera High School – Madera Unified School District
200 S L St., Madera, CA 93637
Madera, CA

Engineer's Project Number: 1336

- B. Owner:

Madera Unified School District
1902 Howard RD,
Madera, CA

Telephone: 559-675-4548
Contact: Rosalind Cox, Rosalindcox@maderausd.org

- C. Engineer:

NET POSITIVE
1446 Tollhouse Rd, Suite 102
Clovis, California 93611

Telephone 559-940-7293
Contact: Jonathan Schlundt

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of the Project is defined by the Contract Documents and consists of the following:
 - 1. The project consists of the removal and replacement of two (2) rooftop air handler units at the East Gym, four (4) rooftop air handler units at the Locker Rooms, and two (2) rooftop air handler units at the West Gym. Related scope includes equipment installation, ductwork, gas piping, hydronic piping, electrical panels, electrical power, and controls.
- B. Type of Contract: Project will be constructed under a single prime contract.

1.5 COORDINATION WITH OCCUPANTS

- A. Full Owner Occupancy: Owner will occupy site existing and adjacent building(s) during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.
 - 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
 - 2. Notify the Owner not less than 72 hours in advance of activities that will affect Owner's operations.
- B. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.
 - 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
 - 2. Provide not less than 72 hours notice to Owner of activities that will affect Owner's operations.
- C. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed portions of the Work,

prior to Substantial Completion of the Work, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total Work.

1. Engineer will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to Owner acceptance of the completed Work.
2. Obtain a Certificate of Occupancy from authorities having jurisdiction before limited Owner occupancy.
3. Before limited Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of Work.
4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of Work.

1.6 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
 1. Comply with limitations on use of public streets and other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7:00 a.m. to 5:00 p.m., Monday through Friday, except as otherwise indicated.
 1. Submit a written request to the Engineer for work hours outside of the indicted on-site hours; request subject to review by the Owner.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
 1. Notify Engineer and Owner not less than 2 days in advance of proposed utility interruptions.
 2. Obtain Engineer's and Owner's written permission before proceeding with utility interruptions.
- D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
 1. Notify Engineer and Owner not less than 2 days in advance of proposed disruptive operations.
 2. Obtain Engineer's and Owner's written permission before proceeding with disruptive operations.
- E. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

1.7 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 - 2. Specification requirements are to be performed with by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
 - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 - 2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings.
 - 3. Keynoting: Materials and products are identified by reference keynotes.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 011103
ADDENDA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative requirements for Addenda issued prior to bid opening.
- B. Related Requirements:
 - 1. Division 00 Sections as applicable to contract requirements and modifications.
 - 2. Division 01 Section "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.
 - 3. Division 01 Section "Contract Modification Procedures" for changes to the Contract Documents after award of the Contract.

1.3 NOTICE TO BIDDERS

- A. Addenda will be issued to registered plan holders for changes to the drawings and specifications during the bidding period prior to the bid opening. Addenda shall serve to clarify, revise, and supersede information in the Project Manual, Drawings, and previously issued Addenda. Portions of the Addenda affecting the Contract Documents will be incorporated into the Contract by enumeration of the Addendum in the Owner/Contractor Agreement.
- B. The Bidder shall acknowledge receipt of this Addendum in the appropriate space on the Bid Form.

1.4 GOVERNING AGENCY REVIEW AND APPROVAL

- A. Addenda shall be submitted to the Authority having Jurisdiction (AHJ) by the project Architect and shall be approved by the AHJ in order to be officially incorporated into the construction documents.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 011105
USE OF ENGINEER'S ELECTRONIC FILES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes Administrative and procedural requirements for use of Engineer's electronic Contract Document drawing files.
- B. Related Sections:
 - 1. Division 01 Section "Project Management and Coordination."
 - 2. Division 01 Section "Submittal Procedures."
 - 3. Division 01 Section "Project Record Drawings."

1.3 USE OF ENGINEER'S ELECTRONIC FILES

- A. Architect may make available to Contractor digital data files of Engineer's Drawings for use in preparing shop drawings, coordination drawings, and project record drawings.
 - 1. Electronic files will be available without charge.
 - 2. Engineer makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
 - 3. Files will be supplied digitally via email or FTP site and will be in PDF, DWG, or similar common format.
 - 4. Waiver of Liability: Contractor, Subcontractors, and Suppliers of this Project shall each execute a waiver of liability for each use of the Engineers electronic files.
 - a. Waiver of Liability form shall be submitted to the Engineer at the time or request for use of Engineer's electronic data files.
 - b. Waiver of Liability form shall be the "ELECTRONIC DATA FILE DISTRIBUTION WAIVER OF LIABILITY FORM" included at the end of this Specification Section.
 - c. The use of the electronic files shall only be used for this Project and for the identified purposes noted in the Waiver of Liability form.
 - 1) Each entity shall be responsible for complying with the restrictions of the Liability Waiver form.
 - 2) Electronic Contract Document drawing files received from the architect shall not be duplicated without written permission of the Engineer.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

(Electronic Data File Distribution Waiver of Liability included on the following page)

ELECTRONIC DATA FILE DISTRIBUTION WAIVER OF LIABILITY**NET POSITIVE**1446 Tollhouse Rd, Suite 102
Clovis, California 93611

Project: _____

Intended Use: _____

Any electronic data, files or information provided under this Agreement are the property of the above listed Professionals and consultants (Team). It is understood and agreed that the information contained in these electronic data file shall not be copied or duplicated for any use other than the project for which they were created. It is understood by the undersigned that compatibility of this electronic media with other systems is not guaranteed, and conversion to other systems is done at the user's own risk.

The user hereby agrees and recognizes that designs, plans and data stored on electronic media including, but not limited to, computer disk and magnetic tape, may be subject to undetectable alteration and/or uncontrollable deterioration. It is agreed by the undersigned that the Team shall not be liable for the completeness or accuracy of any material provided on electronic media.

The undersigned agrees to defend, hold harmless and indemnify the Team and its officers, directors, employees, agents and consultants for any and all claims, losses, costs or damage whatsoever arising out of, resulting from, or in any way related to the use of electronic data files provided hereunder, whether that use is authorized or unauthorized. The user further agrees to defend, indemnify and hold harmless the Team its officers, directors, employees, agents and consultants from any and all claims, damages, losses, expenses and injuries arising out of the modification of the electronic data files by the user or by anyone obtaining said files through or from the user.

The Team bears no responsibility for the information in the electronic data files once it leaves the offices of **NET POSITIVE**. The undersigned understands that the electronic data files are subject to applicable copyright laws of the United States and agrees to be bound by same. Upon our receipt of this agreement duly executed by an Officer of your firm you may request the Data files.

Name (Print/Sign): _____ Date: _____

Firm: _____

Phone and email: _____

Name (Print/Sign): _____ Date: _____

Firm: _____

Phone and email: _____

Name (Print/Sign): _____ Date: _____

Firm: _____

Phone and email: _____

SECTION 012200
UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for unit prices.
- B. Related Requirements:
 - 1. Division 01 Section "Allowances" for procedures for using unit prices to adjust quantity allowances.
 - 2. Section 012600 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.

1.3 DEFINITIONS

- A. Unit price is a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
- B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the Part 3 "Schedule of Unit Prices" Article contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

- A. Unit Price No. 1: Removal of unsatisfactory wood roof deck and replacement with new plywood sheathing.
 - 1. Description: Unsatisfactory wood roof deck and replacement with new plywood sheathing in accordance with 070150 "Preparation for Re-Roofing".
 - 2. Unit of Measurement: 4 foot by 4 foot area shall be considered one unit.
 - 3. Quantity: The number of units shall be determined
 - 4. Square feet of wood roof deck removed.
- B. Unit Price No. 2: Cutting and patching of concrete slabs-on-grade.
 - 1. Description: Cutting of new or existing concrete slabs-on-grade up to 6 inches thick, removal and excavation as required, and subsequent backfill, compaction, and patching of concrete in accordance with Section 017300 "Execution." not otherwise indicated in the Contract Documents.
 - 2. Unit of Measurement: Square feet of concrete removed.
- C. Unit Price No. 3: Miscellaneous and structural steel.
 - 1. Description: Miscellaneous lintels and other supports not otherwise indicated in the Contract Documents, in accordance with Section 051200 "Structural Steel Framing" and Section 055000 "Metal Fabrications."
 - 2. Unit of Measurement: Cost in place of pounds of fabricated steel, as indicated on itemized invoice of steel supplier.

END OF SECTION

SECTION 012500
SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Sections:
 - 1. Division 00 Section "Instructions to Bidders" and other Division 00 Sections as applicable to substitution requests prior to submission of bids.
 - 2. Division 01 Section "DSA Hourly Fee Services" for DSA hourly fee services for review of changes to DSA approved Construction Documents.
 - 3. Division 01 Section "Contract Modification Procedures" for changes to DSA approved Construction Documents."
 - 4. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
 - 5. Divisions 02 through 33 Sections for specific requirements and limitations for substitutions.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 2. Substitutions for Convenience: Changes proposed by Contractor that are not required in order to meet other Project requirements but may offer advantage to the Owner.

1.4 REGULATORY REQUIREMENTS

- A. Division of the State Architect (DSA) Review and Approval: Substitutions resulting in changes to DSA approved Construction Documents may be considered a change requiring DSA review and approval and submission of a DSA Construction Change Document (CCD) form by the Engineer.

1. DSA Construction Change Documents shall be as specified in Division 01 Section "Contract Modification Procedures."
2. DSA Hourly Fee Services for review of CCD's shall be as specified in Division 01 Section "DSA Hourly Fee Services."

1.5 SUBMITTALS

- A. Substitution Requests: Submit documentation identifying product or fabrication or installation method to be replaced. Include Specification Section number and title, and Drawing numbers and titles.

1. Substitution Request Form: Use form provided at the end of this Section.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
 - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable specification section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects with project names and addresses and names and addresses of Engineer and Owners.
 - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
 - j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from

- manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
- k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Engineer will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later. Engineer will not act on any Post-Bid Substitutions until 7 days following the submission of the Schedule of Values per Division 01 Section "Payment Procedures."
- a. Forms of Acceptance:
 - 1) Substitutions Prior to Bid: Addenda will be issued for substitutions accepted prior to bid.
 - 2) Substitutions After Award of Contract: Change Order, Construction Change Directive, or Engineer 's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Engineer does not issue a decision on use of a proposed substitution within time allocated.

1.6 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage qualified testing agency to perform compatibility tests recommended by manufacturers.

1.7 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Substitutions Prior to Bid: Engineer will consider requests for substitution if received within 21 days prior to the submission of bids. Requests received after that time may be considered or rejected at discretion of Engineer.
 - 1. Conditions: Engineer will consider bidder's request for substitution when the following conditions are satisfied.
 - a. Substitutions prior to bid shall also be subject to the requirements of applicable Division 00 Specification Sections.
 - b. Substitutions prior to bid shall comply with the requirements for Substitutions for Cause or Substitutions for Convenience as applicable.
 - 2. Substitutions requested by bidders during the bidding period, and accepted by Addendum prior to award of the Contract, are considered as included in the Contract Documents.
- B. Substitutions After Award of Contract: The Contractor after award of the Contract, as allowed by the General Conditions, may submit materials and methods to be considered for substitutions.
 - 1. The following are not considered to be substitutions:
 - a. Revisions to the Contract Documents requested by the Owner or Engineer.
 - b. Specified options of products and construction methods included in the Contract Documents.
 - c. The Contractor's compliance with governing regulations and orders issued by governing authorities.
- C. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than 21 days prior to time required for preparation and review of related submittals.
 - 1. Conditions: Engineer will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Engineer will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Substitution request is fully documented and properly submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.

- f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- D. Substitutions for Convenience: Engineer will consider requests for substitution if received within 60 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Engineer.
- 1. Conditions: Engineer will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Engineer will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Engineer for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - b. Requested substitution does not require extensive revisions to the Contract Documents.
 - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - d. Substitution request is fully documented and properly submitted.
 - e. Requested substitution will not adversely affect Contractor's construction schedule.
 - f. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - g. Requested substitution is compatible with other portions of the Work.
 - h. Requested substitution has been coordinated with other portions of the Work.
 - i. Requested substitution provides specified warranty.
 - j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION (Not Used)

END OF SECTION

(Substitution Request Form included on the following page)



SUBSTITUTION REQUEST FORM

FOR: HVAC Improvements at Madera South High School

We hereby submit for your consideration the following product instead of the specified item for the above project:

SECTION	PARAGRAPH	SPECIFIED ITEM
_____	_____	_____

Proposed Substitution: _____

Attach complete technical data, including laboratory tests, if applicable.

Include complete information on changes to Drawings and/or Specifications which proposed substitution will require for its proposed installation.

Fill in the blanks below:

- A. Does the substitution affect dimension on Drawings:

- B. Will the undersigned pay for changes to the building design, including engineering and detailing costs caused by the requested substitution?

- C. What affect does substitution have on other trades?

- D. Difference between proposed substitution and specified item?

- E. Manufacturer's guarantees of the proposed and specified items are:
_____ Same _____ Different (explain on attachment)
- F. Cost difference between proposed substitution and specified item - savings to Owner?

The undersigned states that the function, appearance and quality are equivalent or superior to the specified item and will be at no additional cost to the Owner.

Submitted to the Engineer by:

Signature: _____	For Use by Design Consultant
Firm: _____	Accepted _____
Address: _____	Accepted as Noted _____
_____	Not Accepted _____
_____	Received Too Late _____
Date: _____	By: _____
Telephone: _____	Date: _____
Remarks: _____	

SECTION 012600
CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Division of the State Architect (DSA) Interpretation of Regulations IR A-6 "Construction Change Document Submittal and Approval Process," latest edition (This document is available on DSA's website).

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications including the following:
 - 1. Governing Agency requirements.
 - 2. Engineer's Supplemental Instructions.
 - 3. Engineer's Change Directive.
 - 4. Proposal Requests.
 - 5. Change Orders.
- B. Related Requirements:
 - 1. Division 00 Sections as applicable to contract requirements and modifications.
 - 2. Division 01 Section "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.
 - 3. Division 01 Section "DSA Hourly Fee Services" for fees charged by DSA for changes to the Construction Documents.

1.3 DEFINITIONS

- A. Contract Modification: A change to the Contract Agreement between the Owner and the Contractor affecting the Contract Documents, the Contract Time, and/or the Contract Amount.
- B. Change Order (CO): A document defining Contract Modifications. Change Orders shall be issued by the Engineer and shall be signed by the Engineer, Owner, and Contractor.
- C. Construction Change Document (CCD): A form required by DSA for documentation of changes to the DSA approved Construction Documents.

- D. Engineer's Change Directive (ACD): A form utilized by the Engineer directing the Contractor to proceed with a change that may or may not require DSA approval.
- E. Engineer's Supplemental Instruction (ASI): For minor changes in the Work not involving adjustment to the Contract Sum or the Contract Time, the Engineer will issue Engineer's Supplemental Instructions authorizing such changes.

1.4 CHANGES TO GOVERNING AGENCY APPROVED CONSTRUCTION DOCUMENTS

- A. Governing Agency Review and Approval: Changes to the Construction Documents are subject to review and approval by the authorities having jurisdiction.

1.5 CHANGES TO DSA APPROVED CONSTRUCTION DOCUMENTS

- A. Division of the State Architect: For projects under the jurisdiction of the Division of the State Architect (DSA), Changes to the Construction Documents shall be reviewed and approved by DSA. Changes to the Construction Documents shall be submitted to DSA by the Architect, submittals for changes shall include DSA Form 140 "Application for Submittal of Post-Approval Document."
- B. DSA Hourly Fee Services: Changes to DSA approved Construction Documents shall be reviewed by DSA and shall be subject to DSA Hourly Fee Services. Charges will be made to the Owner by DSA.
 - 1. Where changes to DSA approved Construction Documents are the result of actions by the Contractor, the Contractor shall be liable for DSA Hourly Fee Services as described in Division 01 Section "DSA Hourly Fee Services."

1.6 ENGINEER'S SUPPLEMENTAL INSTRUCTION

- A. Engineer's Supplemental Instruction (ASI): For minor changes in the Work not involving adjustment to the Contract Sum or the Contract Time, the Engineer will issue Engineer's Supplemental Instructions authorizing such changes.
 - 1. Engineer's Supplemental Instructions affecting changes to the Construction Documents shall be subject to governing agency review and approval, and shall be accompanied by appropriate DSA CCD documentation.
 - 2. Contractor's Response:
 - a. Contractor shall perform the work indicated in the Engineer's Supplemental Instruction without adjustment to the Contract Sum or the Contract Time.
 - b. If the Contractor determines that an adjustment to the Contract Sum or the Contract Time is necessary due to the Engineer's Supplemental Instruction, the Contractor shall respond to the Engineer's Supplemental Instruction as if it were an Engineer/Owner initiated Proposal Request.

1.7 ENGINEER'S CHANGE DIRECTIVE

- A. Engineer's Change Directive (ACD): Engineer may issue an Engineer's Change Directive on Engineer's standard form to instruct Contractor to proceed with a change in the Work for subsequent inclusion in a Change Order.
 - 1. Engineer's Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
 - 2. Engineer's Change Directives affecting structural, fire/life safety, and/or access compliance shall be accompanied by appropriate approved DSA CCD documentation.
 - 3. Engineer's Change Directive shall be issued by the Engineer and shall be signed by the Engineer.
- B. Documentation by Contractor: Maintain detailed records on a time and material basis of work required by the Engineer's Change Directive.
 - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

1.8 PROPOSAL REQUESTS

- A. General: Proposal Requests allow the Contractor to respond to proposed changes in the Work that involve an adjustment to the Contract Sum or the Contract Time. Proposal Requests are not instructions to stop work in progress or execute proposed changes. Upon Owner's approval of a Proposal Request, Engineer will issue a Change Order instructing the Contractor to proceed with the proposed changes (Refer to Part 1 Article "Change Order Procedures").
- B. Engineer/Owner-Initiated Proposal Requests: Engineer will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Contractor's Response: Within time specified in Proposal Request, or not more than 7 days after receipt of Proposal Request when not otherwise specified, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

- e. Quotation Form: Use forms acceptable to Engineer.
- C. Contractor-Initiated Proposals: If conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Engineer. Engineer will not act on any Contractor Initiated Proposals until 7 days following the submission of the Schedule of Values per Division 01 Section "Payment Procedures."
- 1. Include a statement outlining 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 the Contract Time.
 - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 4. Include costs of labor and supervision directly attributable to the change.
 - 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - 6. Comply with requirements in Division 01 Section "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
 - 7. Proposal Request Form: Use form acceptable to Engineer.
- D. Engineer's Response: Within 7 days after receipt of Contractor's response to Engineer/Owner initiated Proposal Request or Contractor's Proposal, Engineer will:
- 1. Issue a Change Order for accepted proposals.
 - 2. Notify the Contractor of unaccepted proposals.
 - 3. Issue an Engineer's Change Directive where changes are necessary for the progress of the Work and changes to the Contract Sum and the Contract Time are in dispute.

1.9 ADMINISTRATIVE CHANGE ORDERS

- A. Unit-Price Adjustment: See Division 01 Section "Unit Prices" (if applicable) for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

1.10 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Proposal Request, Engineer will issue a Change Order for signatures of Owner and Contractor on form provided by Engineer.
 - 1. Change Orders affecting changes to the Construction Documents shall be subject to governing agency review and approval and shall be accompanied by appropriate DSA CCD documentation.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 012605
DSA HOURLY FEE SERVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Division of the State Architect (DSA) Interpretive Regulation IR A-30 "DSA Hourly Fee Services" latest edition (Document is available on DSA's website under "Publications;" Interpretive Regulations (IRs); A- Administrative; IR-30).

<https://www.dgs.ca.gov/dsa/>

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for DSA Hourly Fee Services associated with changes to DSA approved Construction Documents.
- B. Related Requirements:
 - 1. Division 00 Sections as applicable to contract requirements and modifications.
 - 2. Division 01 Section "Addenda"
 - 3. Division 01 Section "Substitution Procedures"
 - 4. Division 01 Section "Contract Modification Procedures"
 - 5. Division 01 Section "Payment Procedures"
 - 6. Division 01 Section "Submittal Procedures"
 - 7. Division 01 Section "Product Requirements"

1.3 DSA HOURLY FEE SERVICES

- A. General: Changes to DSA approved Construction Documents shall be documented by the use of DSA Construction Change Document (CCD) forms. CCD forms shall be submitted to DSA by the Architect.
 - 1. Refer to Division 01 Section "Contract Modification Procedures" for additional information regarding DSA CCD's.
- B. DSA Hourly Fee Services: Changes to DSA approved Construction Documents shall be reviewed by DSA and shall be subject to DSA Hourly Fee Services for review at a rate established by DSA IR A-30. Charges will be made to the Owner by DSA.
 - 1. Hourly Rate: Rate per hour as established by DSA IR A-30, latest edition.

Madera Unified School District
HVAC Improvements at Madera High School

- C. Bidder's Responsibility: Prior to bidding, where a bidder's request for substitution or similar action results in a change requiring DSA Hourly Fee Services, bidder shall submit a deposit to the Engineer for reimbursement for DSA Hourly Fee Services. The deposit amount shall be established by the Engineer, a minimum of one hour of DSA Hourly Fee Services (hourly rate as established by DSA IR A-30) will not be refundable. Deposits shall be made payable to the Owner.
- D. Contractor's Responsibility: When a contractor's action results in a change requiring DSA Hourly Fee Services, charges by DSA to the Owner will be deducted from the Contract Sum and the Engineer will issue a Change Order on a quarterly basis to adjust the Contract Sum.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 012613
REQUEST FOR INFORMATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative provisions for preparation, submittal and response to Contractor's Request for Information (RFI's) during construction of project.
- B. Related Sections:
 - 1. General Conditions of the Contract.

1.3 DEFINITIONS

- A. RFI, Request for Information: Request from Contractor seeking information required by or clarification of the Contract Documents.

1.4 SUBMITTALS

- A. RFI Submittals: Submit RFI's via email as PDF electronic files; include attachments in PDF electronic file format.

1.5 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
 - 1. Engineer will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
 - 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name.
 2. Project number.
 3. Date.
 4. Name of Contractor.
 5. Name of Engineer.
 6. RFI number, numbered sequentially.
 7. RFI subject.
 8. Specification Section number and title and related paragraphs, as appropriate.
 9. Drawing number and detail references, as appropriate.
 10. Field dimensions and conditions, as appropriate.
 11. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 12. Contractor's signature.
 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Form: Use RFI form included at end of this Section or form acceptable to Engineer. Upon request from the Contractor, the form at the end of this section will be made available in WORD format from the Engineer.
- D. Engineer's Action: Engineer will review each RFI, determine action required, and respond.
1. Allow 10 working days for Engineer's response for each RFI. RFIs received by Engineer after 1:00 p.m. will be considered as received the following working day.
 2. Engineer will not act on any RFI's until 7 days following the submission of the Schedule of Values per Division 01 Section "Payment Procedures."
 3. The following RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Engineer's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 4. Engineer's action may include a request for additional information, in which case Engineer's time for response will date from time of receipt of additional information.
 5. Engineer's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."

- a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Engineer in writing within 10 days of receipt of the RFI response.
6. Distribution: The Engineer shall distribute one electronic copy of each completed RFI review to the Contractor and the Owner.
- E. Regulatory Requirements: Engineer's responses that modify the Contract Documents affecting Structural Safety, Fire and Life Safety, and/or Access Compliance shall be submitted to the Division of the State Architect for review and approval.
 1. Changes to DSA approved Construction Documents shall be as specified in Division 01 Section "Contract Modification Procedures."
- F. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the sequential RFI number. Submit log weekly unless otherwise directed in writing by Engineer. Include the following:
 1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Engineer.
 4. RFI number including RFIs that were returned without action or withdrawn.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date Architect's response was received.
- G. On receipt of Engineer's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Engineer within 7 days if Contractor disagrees with response.
- H. Contractor's Expense for RFI's: Engineer will review and respond to legitimate RFI's at no additional cost to the Contractor. RFI's determined by the Engineer to be flagrant or unnecessary will have the expense for the Engineer's time paid by the Owner with the amount being deducted from the Contract Sum. The expense will be based on an hourly rate in accordance with the Engineer's standard hourly rate schedule in effect at the time the work is performed with a minimum of one hour for each flagrant or unnecessary RFI.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

(REQUEST FOR INFORMATION form included on the following page)



REQUEST FOR INFORMATION

Project:

Project Title

NET POSITIVE Project No.

123 Street Address

City, State, Zip

From:

Name

Company Name

To:

Name

Title or Department

NET POSITIVE

123 Street Address

City, State, Zip

Client Project No.

DSA File No.

DSA Appl No.

Date:

Request for Information No. _____

☐ Deviation from Contract Docs

☐ Correction of Non-Compliant Work

Drawing: _____

Respond by:

Detail No. _____

Priority
(Low) 1 2 3 4 5 (High)

Specification: _____

Addendum: _____

Subject: _____

Information Requested:

Contractor's Recommendation:

Probable Cost Effect: _____ Probable Time Effect: _____

Engineer's Response:

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Disclaimer

The work shall be carried out in accordance with the above supplemental instructions pursuant the Contract Documents, without change in the Contract Sum or Contract Time. Proceeding with the Work, according to these instructions, indicates your acknowledgement that there will be no change in the Contract Sum or Contract Time. If the Contractor considers that this response requires a change in the Contract Sum or Contract Time, the Contractor shall not proceed with this Work and shall promptly submit an item proposal.

SECTION 012900
PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections:
 - 1. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 2. Division 01 Section "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.
 - 3. Division 01 Section "Submittal Procedures" for administrative requirements governing the preparation and submittal of the submittal schedule.

1.3 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.
 - c. Items required to be indicated as separate activities in Contractor's construction schedule.

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2. Submit the Schedule of Values to Engineer at earliest possible date but no later than 7 days before the date scheduled for submittal of initial Applications for Payment.
 - a. Engineer will not act on any RFI's, Post-Bid Substitutions, and/or changes to the project scope, cost, or schedule until 7 days following the submission of the Schedule of Values.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
 1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Engineer.
 - c. Engineer's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 2. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
 - 1) Labor.
 - 2) Materials.
 - 3) Equipment.
 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of 5 percent of Contract Sum.
 - a. Include separate line items under Contractor and principal subcontracts for project closeout requirements in an amount totaling 5 percent of the Contract Sum and subcontract amount.
 4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
 5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

- a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
6. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
8. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Engineer and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment application shall be as indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
 1. If dates and periods are not indicated in the Agreement between Owner and Contractor at time of bidding, the date for Application for Payment shall be established by the Owner to correspond with the Owner's administrative procedures in order to allow for processing and approval of Application for Payment. The period of construction work covered by each Application for Payment shall be one month.
 2. Submit draft copy of Application for Payment 7 days prior to due date for review by Engineer.
- C. Application for Payment Forms: Use forms acceptable to Engineer and Owner for Applications for Payment. Submit forms for approval with initial submittal of schedule of values.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Engineer will return incomplete applications without action.

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1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
 4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 3. Provide summary documentation for stored materials indicating the following:
 - a. Materials previously stored and included in previous Applications for Payment.
 - b. Work completed for this Application utilizing previously stored materials.
 - c. Additional materials stored with this Application.
 - d. Total materials remaining stored, including materials with this Application.
- F. Transmittal: Submit 6 signed and notarized original copies of each Application for Payment to Engineer by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 5. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.

- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule (preliminary if not final).
 4. Submittal schedule (preliminary if not final).
 5. List of Contractor's staff assignments.
 6. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 7. Initial progress report.
 8. Report of preconstruction conference.
- I. Application for Payment at Substantial Completion: After issuance of the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portions of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Updated final statement, accounting for final changes to the Contract Sum.
 3. Evidence that claims have been settled.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 013113
PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General project coordination procedures.
 - 2. Administrative and supervisory personnel.
 - 3. Coordination drawings.
- B. Related Sections:
 - 1. Division 01 Section "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
 - 2. Division 01 Section "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 3. Division 01 Section "Closeout Procedures" for coordinating closeout of the Contract.

1.3 SUBMITTALS

- A. List of Key Personnel Names: Within 14 calendar days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and email addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
 - 1. Post copies of list in project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.
- B. Coordination Drawings:
 - 1. Initial Submittal: Submit 3 printed copies of each coordination drawing for each condition where Coordination Drawings are required.
 - 2. Project Closeout:

- a. Submit 3 printed "Record" copies of each coordination drawing for each condition where Coordination Drawings are required.
- b. Submit "Record" electronic coordination drawing files.

1.4 COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to 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. Preinstallation conferences.
 7. Startup and adjustment of systems.
 8. Project closeout activities.
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

PART 2 - PRODUCTS

2.1 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings in accordance with requirements in individual Sections, where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity. Coordination Drawings shall include the work of multiple trades on the same drawing. Prepare Coordination Drawings in addition to Shop Drawings required in individual Sections.
1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
 - b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
 - c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - f. Indicate required installation sequences.
 - g. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Engineer indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B. Coordination Drawings, Required: Coordination drawings shall include plans, elevations, sections, and details of the Work for each trade as required to adequately represent the work. Clearly indicate and identify conflicts between components for review by Engineer. Provide Coordination Drawings as follows:
1. Overhead Work and Work Above Finished Ceilings: Include subframing for support of ceiling and wall systems, conduit and piping runs, plumbing, mechanical, and electrical equipment, and related Work. Locate components to accommodate layout of light fixtures indicated on Drawings. Show the work of each trade including, but not limited to, pipe runs, mechanical ductwork, cable trays, conduit runs, and bracing and supports.

- a. Indicate locations of all dampers, valves, cleanouts and other devices requiring human access for maintenance and repair. Where access panels are required, show locations and indicate size.
 - b. Show the height above finish floor each item, demonstrating sufficient space for installation and maintenance. Indicate sizes of ducts, piping and similar items.
 - c. Layout of work shall be done in such a manner to avoid conflicts between the work of different trades, finish ceiling heights, soffits, light fixtures or other finish work at ceilings and soffits.
 - d. Should unavoidable conflicts occur that affect finish ceiling and soffit heights, methods of installations, methods of construction or means of accessibility, the contractor shall clearly identify each location for review by the Engineer.
2. Equipment Rooms and Outdoor Service Yards: Show work above and below grade including mechanical, plumbing, fire protection, fire alarm, and electrical equipment, and related supports, accessories, and utility connections. Include the following information:
 - a. Equipment: Show equipment and locations, utility connections, and working and service clearances.
 - b. Utilities: Show above and below grade utilities; indicate heights and below grade elevations, sizes of piping and conduit, dimensions between utilities and between utilities and other obstructions including concrete footings for other work. Show locations of all shut-off and isolation valves, cleanouts, filters, and other devices requiring human access for maintenance and repair.
 - c. Enclosures: Show limits of enclosure including walls, doors, fences, and gates; confirm door and gate access width for equipment.
 - d. Dimensions: Indicate dimensions as appropriate to insure adequate clearance will be provided for installation, service, and operation of equipment; include horizontal and vertical dimensions between utilities to insure clearance for installation of utilities. Include vertical dimension(s) of equipment and distances to overhead obstructions where applicable.
3. Roof Mounted Equipment: Show equipment that will be located on the roof, include the following:
 - a. Equipment locations and horizontal distances between equipment.
 - b. Locations of roof penetrations, sizes of penetrations, and indicate the horizontal distance between penetrations and roof mounted equipment.
 - c. Pipe and conduit runs including locations and type(s) of supports.
 - d. Distance between all roof mounted equipment and roof drainage features. Equipment shall be located so as to not obstruct roof drainage; provide at least 24 inches between equipment platforms and valleys formed by the intersection of roof planes and crickets.
4. Underground Site Utilities and Utilities Below Slabs on Grade within Building Areas: Where underground utilities cross other utilities, penetrate footings, underground structures or other obstructions; show the work that will be placed underground; include the following information:

- a. Indicate types and sizes of utility piping and elevations below grade.
 - b. Show footings and other underground structures; where unavoidable conflicts occur between underground structures/footings and utilities, indicate depths below grade and clearly identify locations for sleeving for review by Engineer.
- C. Preparation: Prepare coordination drawings electronically using same digital data software program, version, and operating system as the Engineer's original Drawings (DWG files).
 - 1. Submittal Format:
 - a. Electronic Format: Submit electronic drawing files using Portable Data File (PDF) format.
 - b. Printed Format: Submit plotted drawings on opaque bond paper not of at least 8.5 inches by 11 inches and not larger than 24 inches by 36 inches.
 - 2. Engineer will furnish Contractor digital data files of base drawings as appropriate for use in preparing coordination digital data files.
 - a. Engineer makes no representations as to the accuracy or completeness of digital data files as they relate to the Drawings.
 - b. Digital Data Software Program: The Drawings are available in DWG format.
 - c. Contractor shall execute a data licensing agreement in the form of an Agreement form acceptable to the Owner and Engineer.
- D. Review: Engineer will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are the Contractor's responsibility. If the Engineer determines that the coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, the Engineer will so inform the Contractor, who shall make changes as directed and resubmit.
- E. Resolution of conflicts occurring in the Work after Coordination Drawings have been prepared shall be the responsibility of the Contractor. Contractor shall bear all costs associated with resolution of conflicts including additional contract time, architectural and engineering services fees, and loss of use to the Owner.

PART 3 - EXECUTION

3.1 GENERAL COORDINATION PROVISIONS

- A. Examination of Conditions: Require the Installer of each major component to examine 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.

3.2 CLEANING AND PROTECTION

- A. Clean and protect construction in progress and adjoining materials in place, during handling and installation. Apply protective covering where required to assure protection from damage or deterioration at Substantial Completion.
- B. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period.
- C. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

END OF SECTION

SECTION 013119
PROJECT MEETINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative provisions for project meetings, including, but not limited to, the following:
 - 1. Preconstruction conferences.
 - 2. Preinstallation conferences.
 - 3. Progress meetings.
 - 4. Project Closeout Conference.
- B. Related requirements include but are not limited to the following:
 - 1. Division 01 Sections as applicable to project management.

1.3 PRECONSTRUCTION CONFERENCE

- A. Preconstruction Conference: Schedule a preconstruction conference before starting construction at the project site, at a time convenient to the Owner, Inspector of Record, and the Engineer, but no later than 14 days after execution of the Agreement. Hold the conference at the Project Site or another convenient location. Owner and Engineer to conduct the meeting to review responsibilities and personnel assignments.
- B. Attendees: Authorized representatives of the Owner, Engineer, and their consultants; the Contractor and its superintendent shall attend the conference. Major subcontractors and other concerned parties shall be invited to attend the conference, but attendance is not mandatory. Participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.
- C. Agenda: Discuss items of significance that could affect progress, including but not limited to the following:
 - 1. Tentative construction schedule.
 - 2. Critical work sequencing and long-lead items.
 - 3. Designation of key personnel and their duties.
 - 4. Lines of communication.
 - 5. Procedures for processing field decisions and Change Orders.
 - 6. Procedures for processing Applications for Payment.

7. Procedures for RFI's.
8. Procedures for testing and inspection.
9. Submittal procedures.
10. Sustainability requirements including construction waste management and disposal.
11. Preparation of record documents.
12. Use of the premises.
13. Work restrictions and working hours.
14. Temporary facilities and controls.
15. Parking availability.
16. Office, work, and storage areas.
17. Equipment deliveries and priorities.
18. Safety procedures and first aid.
19. Security.
20. Housekeeping.
21. Owner's alcohol, drug and tobacco policy.

- D. Minutes: Engineer shall record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner, Inspector of Record, and Contractor, within three days of the meeting.

1.4 PREINSTALLATION CONFERENCES

- A. Preinstallation Conferences: Conduct a preinstallation conference at the Project Site before each construction activity that requires coordination with other construction.
- B. Attendees: Installers and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the Owner, Inspector of Record, and Engineer of scheduled meeting dates.
- C. Agenda: Review the progress of other construction activities and preparations for the particular activity under consideration at each preinstallation conference, including requirements for the following:
1. Contract Documents.
 2. Options.
 3. Related RFI's, Proposal Requests, and Change Orders.
 4. Purchases.
 5. Deliveries.
 6. Submittals.
 7. Sustainability requirements.
 8. Possible conflicts.
 9. Compatibility problems.
 10. Time schedules.
 11. Weather limitations.
 12. Manufacturer's written instructions.
 13. Warranty requirements.
 14. Compatibility of materials.
 15. Acceptability of substrates.

16. Temporary facilities.
 17. Space and access limitations.
 18. Regulations of authorities having jurisdiction.
 19. Safety.
 20. Testing and inspecting requirements.
 21. Required performance results.
 22. Recording requirements.
 23. Protection.
 24. Record significant conference discussions, agreements, disagreements, including corrective measures and actions.
 25. Promptly distribute minutes of the meeting to each party present and to other parties requiring information, including the Owner and the Architect.
 26. Do not proceed with the installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.
- D. Minutes: Contractor shall record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner, Inspector of Record, and Engineer, within three days of the meeting.

1.5 PROGRESS MEETINGS

- A. Progress Meetings: Conduct progress meetings at the Project Site at regular intervals to be established by the Engineer, Inspector of Record, Contractor, and Owner.
1. Coordinate dates of meetings with preparation of the payment request.
- B. Attendees: In addition to representatives of the Owner and Engineer, each subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.
- C. 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 status of the Project. Review proposed percentages of work completed for current months progress payment.
1. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. 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 the following:
 - a. Interface requirements.
 - b. Sequence of operation.
 - c. Status of submittals.
 - d. Status of Sustainability documentation.
 - e. Deliveries.
 - f. Off-site fabrication.
 - g. Access.
 - h. Site utilization.
 - i. Temporary facilities and services.
 - j. Status of correction of deficient items.
 - k. Field observations.
 - l. Status of RFI's, Proposal Requests, and Change Orders.
 - m. Progress cleaning.
 - n. Quality and work standards.
 - o. Documentation of information for payment requests.
 - p. Request for Information
- D. Minutes: Engineer shall record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner, Inspector of Record, and Contractor, within three days of the meeting.
- E. Schedule Updating: Revise the Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule to the Owner, the Engineer, and all other parties involved in the project. Failure to revise and keep current the Contractor's construction schedule may be grounds for returning Application for Payment unreviewed.

1.6 PROJECT CLOSEOUT CONFERENCE

- A. Project Closeout Conference: Conduct a project closeout conference, at a time convenient to Owner and Engineer, but not less than 90 days prior to the scheduled date of Substantial Completion. Conduct the conference to review requirements and responsibilities related to Project closeout.
- B. Attendees: Authorized representatives of Owner, Engineer and their consultants; Contractor and its superintendent. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
- C. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
 1. Preparation of record documents.
 2. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
 3. Submittal of written warranties.
 4. Requirements for completing Sustainability documentation.
 5. Requirements for preparing operations and maintenance data.

6. Requirements for delivery of material samples, attic stock, and spare parts.
 7. Requirements for demonstration and training.
 8. Preparation of Contractor's punch list.
 9. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
 10. Submittal procedures.
 11. Responsibility for removing temporary facilities and controls.
- D. Minutes: Contractor shall record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner, Inspector of Record, and Engineer, within three days of the meeting.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

END OF SECTION

SECTION 013200
CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. 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. Special reports.
- B. Related Sections include but are not limited to the following:
 - 1. Division 01 Section "Submittal Procedures" for submitting schedules and reports.
 - 2. Division 01 Section "Quality and Testing Requirements" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.
- B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of the Project.
- C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- D. Event: The starting or ending point of an activity.
- E. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- F. Milestone: An activity, which occurs in an instant and thus has no time duration, a key or critical point in time for reference or measurement.

1.4 SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
1. Working electronic copy of schedule file, where indicated.
 2. PDF electronic file.
- B. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.
- C. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
1. Submit electronic copy of schedule labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.
- D. Construction Schedule Updating Reports: Submit with Applications for Payment.
- E. Special Reports: Submit at time of unusual event.

1.5 QUALITY ASSURANCE

- A. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Meetings." Review methods and procedures related to the preliminary construction schedule and Contractor's construction schedule, including, but not limited to, the following:
1. Discuss constraints, including area separations, interim milestones, and partial Owner occupancy.
 2. Review delivery dates for Owner-furnished products.
 3. Review schedule for work of Owner's separate contracts.
 4. Review submittal requirements and procedures.
 5. Review time required for review of submittals and resubmittals.
 6. Review requirements for tests and inspections by independent testing and inspecting agencies.
 7. Review time required for Project closeout and Owner startup procedures, including commissioning activities.
 8. Review and finalize list of construction activities to be included in schedule.
 9. Review procedures for updating schedule.

1.6 COORDINATION

- A. Coordinate preparation and processing of schedules with performance of construction activities and with scheduling of separate contractors.
- B. Coordinate Contractor's construction schedule with the submittal schedule and other required schedules.
 - 1. Secure time commitments for performing critical elements of the Work from entities involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of final 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.
- B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
 - 1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Engineer.
 - 2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 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 resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
 - 4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
 - 5. Completion: Indicate completion in advance of date established for completion, and allow time for Engineer's administrative procedures necessary for certification of completion.
 - 6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.
- C. 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. Phasing: Arrange list of activities on schedule by phase.
 - 2. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.

3. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 4. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 5. 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. Partial occupancy before Substantial Completion.
 - e. Use of premises restrictions.
 - f. Provisions for future construction.
 - g. Seasonal variations.
 - h. Environmental control.
 6. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Submittals.
 - b. Purchases.
 - c. Mockups.
 - d. Fabrication.
 - e. Sample testing.
 - f. Deliveries.
 - g. Installation.
 - h. Tests and inspections.
 - i. Adjusting.
 - j. Curing.
 - k. Startup and placement into final use and operation.
 7. Construction Areas: 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. Structural completion.
 - b. Temporary enclosure and space conditioning.
 - c. Permanent space enclosure.
 - d. Completion of mechanical installation.
 - e. Completion of electrical installation.
 - f. Substantial Completion.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.
- E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis to demonstrate the effect of the proposed change on the overall project schedule.

- F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
 - 1. Unresolved issues.
 - 2. Unanswered Requests for Information.
 - 3. Rejected or unreturned submittals.
 - 4. Notations on returned submittals.
 - 5. Pending modifications affecting the Work and Contract Time.
- G. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.
- H. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

- A. General: Prepare network diagrams using AON (activity-on-node) format.
- B. CPM Schedule: Prepare Contractor's construction schedule using a time-scaled CPM network analysis diagram for the Work.
 - 1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 30 days after date established for the Notice to Proceed.
 - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Engineer's approval of the schedule.
 - 2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
 - 3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
 - 4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule in order to coordinate with the Contract Time.
- C. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Prepare a skeleton network to identify probable critical paths.
 - 1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:

- a. Preparation and processing of submittals.
 - b. Mobilization and demobilization.
 - c. Purchase of materials.
 - d. Delivery.
 - e. Fabrication.
 - f. Utility interruptions.
 - g. Installation.
 - h. Work by Owner that may affect or be affected by Contractor's activities.
 - i. Testing
 - j. Commissioning.
 - k. Punch list and final completion.
 - l. Activities occurring following final completion.
2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
 - a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.
- D. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall project schedule.
- E. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:
 1. Contractor or subcontractor and the Work or activity.
 2. Description of activity.
 3. Main events of activity.
 4. Immediate preceding and succeeding activities.
 5. Early and late start dates.
 6. Early and late finish dates.
 7. Activity duration in workdays.
 8. Total float or slack time.
 9. Average size of workforce.
- F. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
 1. Identification of activities that have changed.
 2. Changes in early and late start dates.
 3. Changes in early and late finish dates.
 4. Changes in activity durations in workdays.

5. Changes in the critical path.
6. Changes in total float or slack time.
7. Changes in the Contract Time.

2.3 SPECIAL REPORTS

- A. 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 Owner in advance when these events are known or predictable.
 1. Submit special reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.
- 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.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At progress meetings, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 3. As the Work progresses, indicate final completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Engineer, Owner, Inspector of Record, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
 1. Post copies 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

SECTION 013300
SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Submittal schedule requirements.
2. Administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
3. Cost for multiple resubmittals.

B. Related Sections:

1. Division 01 Section "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Division 01 Section "Project Management and Coordination" for submitting coordination drawings.
3. Division 01 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
4. Division 01 Section "Photographic Documentation" for submitting preconstruction photographs, periodic construction photographs, and final completion construction photographs.
5. Division 01 Section "Quality and Testing Requirements" for submitting test and inspection reports, and schedule of tests and inspections.
6. Division 01 Section "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
7. Division 01 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
8. Division 01 Section "Project Record Drawings" for submitting record Drawings.
9. Division 01 Section "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 SUBMITTAL SCHEDULE

- A. Submittal Schedule: Submit as a submittal, a list of submittals arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or modifications to submittals

noted by the Engineers and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Initial Submittal: Submit concurrently with start-up construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
4. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Name of subcontractor.
 - d. Description of the Work covered.
 - e. Scheduled date for Engineer's final release or approval.
 - f. Scheduled dates for purchasing.
 - g. Scheduled date of fabrication.
 - h. Scheduled dates for installation.
 - i. Activity or event number.

1.4 SUBMITTAL FORMAT AND PROCEDURES

- A. General: Prepare and submit submittals required by individual Specification Sections.
 1. Engineer will not review submittals received from Contractor that do not have Contractor's review and approval.
 2. Engineer will not review submittals received from sources other than the Contractor.
- B. Electronic Digital Submittals: Prepare submittals as PDF package unless otherwise indicated, incorporate complete information into each PDF file, name PDF file with submittal number, and transmit submittal package to Engineer via email.
 1. Paper Submittals: Where paper submittals are requested, necessary, or required in lieu of electronic submittals, prepare submittals in paper form and deliver to Engineer. Transmit each paper submittal using transmittal form. Comply with the following:
 - a. Place a permanent label or title block on each submittal item for identification; include name of firm or entity that prepared submittal.
 - b. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Engineer.

- c. Number of Copies: Submit not less than three paper copies of each submittal unless otherwise indicated. Engineer will return two copies.
 - d. Transmittal for Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using transmittal form.
- C. Submittal Cover Page Information: Include the following information on the submittal cover page for each submittal:
 - 1. Project name.
 - 2. Date.
 - 3. Name of Engineer.
 - 4. Name of Contractor.
 - 5. Name of firm or entity that prepared submittal.
 - 6. Names of subcontractor, manufacturer, and supplier.
 - 7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier and alphanumeric suffix for resubmittals.
 - 8. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
 - 9. Drawing number and detail references, as appropriate.
 - 10. Indication of full or partial submittal.
 - 11. Location(s) where product is to be installed, as appropriate.
 - 12. Other necessary identification.
 - 13. Remarks.
 - 14. Signature of transmitter.
 - 15. Contractor's review/approval stamp of size required by contractor, approximately 3 inches by 3 inches, on or beside title block to record Contractor's review and approval.
 - 16. Space for Engineer's review stamp of not less than 4 inches wide by 3-1/2 inches high on or beside title block to record Engineer's review stamp and action taken by Engineer.
- D. Product Options:
 - 1. Clearly identify options requiring selection by Engineer.
 - 2. Clearly identify product options required to comply with the Contract Documents.
- E. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Engineer on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.
- F. Field Conditions: Indicate field conditions where applicable to the work associated with the submittal.

- G. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 4. Coordinate timing of submitting submittals for related parts of the Work specified in different Sections so processing will not be delayed because of need to review related submittals concurrently for coordination.
 - a. Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- H. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow 14 calendar days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow 14 calendar days for review of each resubmittal.
 4. Sequential Review: Where sequential review of submittals by Engineer's consultants, Owner, or other parties is indicated, allow 21 calendar days for initial review of each submittal.
 5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Engineer and to Engineer's consultants, allow 14 calendar days for review of each submittal. Submittal will be returned to Engineer before being returned to Contractor.
 - a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Engineer.
- I. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 3. Resubmit submittals until they are marked with approval notation from Engineer's action stamp.

- J. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- K. Use for Construction: Retain complete copies of submittals on Project site. Use only final submittals that are marked with acceptable notation from Engineer's action stamp.

1.5 SUBMITTAL REQUIREMENTS

- A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - 1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Mark each copy of each submittal to show which products and options are applicable.
 - 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
 - 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams that show factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 - 5. Submit Product Data before Shop Drawings, and before or concurrently with Samples.
- B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 - 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.

- e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
- 2. Drawing Sheet Size: Except for templates, patterns, and similar full-size Drawings, prepare Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.
 - 3. Submit Shop Drawings in PDF format unless otherwise indicated.
- C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.
- 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 - 2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
 - a. Project name and submittal number.
 - b. Generic description of Sample.
 - c. Product name and name of manufacturer.
 - d. Sample source.
 - e. Number and title of applicable Specification Section.
 - f. Specification paragraph number and generic name of each item.
 - 3. Submit samples in PDF format unless physical samples are required.
 - 4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
 - 5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Engineer will return submittal with options selected.
 - 6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of

repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

- a. Number of Samples: Submit three (3) sets of Samples. Engineer will retain two (2) Sample sets; remainder will be returned.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three (3) sets of paired units that show approximate limits of variations.
- D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
 1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
 2. Manufacturer and product name, and model number if applicable.
 3. Number and name of room or space.
 4. Location within room or space.
- E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of Engineers and Owners, and other information specified.
- F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.
- G. Certificates:
 1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
 2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
 3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
 4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

H. Test and Research Reports:

1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - a. Name of evaluation organization.
 - b. Date of evaluation.
 - c. Time period when report is in effect.
 - d. Product and manufacturers' names.
 - e. Description of product.
 - f. Test procedures and results.
 - g. Limitations of use.

1.6 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Engineer.

- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file(s) of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

1.7 CONTRACTOR'S REVIEW

- A. Contractor's Review of Submittals: Contractor shall review each submittal and check for completeness, coordination with other Work of the Contract, and compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Engineer.
- B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
 - 1. Engineer will not review submittals received from Contractor that do not have Contractor's review and approval.
 - 2. Contractor's approval shall certify the following actions by the Contractor:
 - a. Field measurements have been determined, verified, and indicated on submittal.
 - b. Field conditions have been verified and coordinated with Work associated with the submittal.
 - c. The Work associated with the submittal is in conformance with the Contract Documents.
 - d. Work being performed by various subcontractors and trades is coordinated with Work associated with the submittal including work being performed by others for the Owner.
 - e. Deviations from the Contract Documents are identified and notes.

1.8 ENGINEER'S REVIEW

- A. Engineer's Review and Action: Engineer will review each submittal, indicate corrections or revisions required, mark with an action stamp indicating one of the following actions, and return it.
 - 1. Reviewed: Final unrestricted release, work may proceed, provided it complies with the Contract Documents.
 - 2. Furnish as Corrected: Final but restricted release, work may proceed, provided written confirmation is delivered to Engineer by Contractor that installed work complied with notations and corrections on submittal and with Contract Documents.

3. Revise and Resubmit: Returned for resubmittal, do not proceed with work. Revise submittal in accordance with notations thereon, and resubmit without delay to obtain an acceptable action marking. Do not allow submittals with this marking (or unmarked submittals where a marking is required) to be used in connection with performance of the Work.
 4. Rejected: Submittal content varies from the Contract Documents and is not acceptable for use on the Project, do not proceed with work. Revise submittal in accordance with notations thereon, and resubmit without delay to obtain an acceptable action marking. Do not allow submittals with this marking (or unmarked submittals where a marking is required) to be used in connection with performance of the Work.
- B. Non-conforming Submittals: The following are considered non-confirming submittals and will not be reviewed by the Engineer.
1. Engineer will not review submittals received from Contractor that do not have Contractor's review and approval.
 2. Engineer will not review submittals received from sources other than the Contractor.
 3. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
 4. Incomplete submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- C. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

1.9 COST FOR MULTIPLE RESUBMITTALS

- A. Contractor's initial submittal and one resubmittal are included in the Engineer's Construction Administration services to the Owner. Engineer's services for review of subsequent resubmittals will be charged to the Owner at the Engineer's current billing rate, and the Owner will deduct the charges from the Contract Amount by a change order.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 014000
QUALITY AND TESTING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control including but not limited to the following:
 - 1. General quality requirements.
 - 2. Reports and documents.
 - 3. Contractor's responsibilities in regard to testing and inspections.
 - 4. Inspector of Record (IOR).
 - 5. Testing Agency.
 - 6. Governing agency testing and inspection requirements.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and 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 other quality-assurance and control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and control services required by Engineer, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Requirements:
 - 1. Divisions 02 through 33 Sections for specific test and inspection requirements.
- D. DSA Testing and Inspection Requirements for School Construction: The following requirements are per the Division of the State Architect (DSA); requirements indicated below may be repeated elsewhere in this Section or in other Sections of the Project Manual, where conflicts occur, the most stringent condition shall apply.
 - 1. Tests:

- a. The owner will select an independent testing laboratory, approved by DSA, to conduct the tests. Selection of the material required to be tests shall be by the laboratory or the Owner's representative and not by the Contractor.
 - b. The Contractor shall notify the Owner's representative a sufficient time in advance of the manufacture of material to be supplied by him under the Contract Documents, which must by terms of the Contract be tested, in order that the Owner may arrange for the testing of same at the source of supply.
 - c. Any material shipped by the Contractor from the source of supply prior to having satisfactorily passed such testing and inspection or prior to the receipt of notice from said representative that such testing and inspection will not be required shall not be incorporated in the job.
 - d. The Owner will pay testing laboratory costs for all tests and inspections, but may be reimbursed by the Contractor for such costs under the Contract documents.
2. Tests Reports: One copy of all test reports shall be forwarded to the Division of the State Architect by the testing agency. Such reports shall include all the tests made, regardless of whether such tests indicate that the material is satisfactory or unsatisfactory. Samples taken but not tested shall also be reported. Records of special sampling operations as required shall also be reported. The reports shall show that the material or materials were sampled and tested in accordance with the requirements of Title 24 and with the approved specifications. Test reports shall show the specified design strength. They shall also state defiantly whether or not the material or materials tested comply with requirements.
3. Verification of Test Reports: Each testing agency shall submit to the Division of the State Architect a verified report in duplicate covering all the tests which are required to be made by that agency during the progress of the project. Such report shall be furnished each time that work on the project is suspended, covering the tests up to that time, and at the completion of the project, covering all tests.
4. Inspection by the Owner:
 - a. The Owner and his representatives shall at all times have access for the purpose of inspection to all parts of the work and to the shops wherein the work is in preparation, and the Contractor shall at all times maintain proper facilities and provide safe access for such inspection.
 - b. The Owner shall have the right to reject materials and workmanship which are defective, or to require their correction. Rejected workmanship shall be satisfactorily corrected and rejected materials shall be removed from the premises without charge to the Owner. If the Contractor does no correct such rejected work within a reasonable time, fixed by written notice, the Owner may correct same and charge expense to the Contractor.
 - c. Should it be considered necessary or advisable by the Owner at any time before final acceptance of the entire work to make an examination of the work already completed by removing or tearing out the same, the Contractor shall on request promptly furnish all necessary facilities, labor and materials. If such work is found to be defective in any respect due to the fault of the Contractor or his subcontractor, he shall defray all expenses of such examinations and of satisfactory reconstruction. If however, such work is found to meet the requirements of the Contract, the additional cost

of labor and material necessarily involved in the examination and replacement shall be allowed the Contractor.

5. Inspector – Owner's:

- a. An Inspector employed by the Owner, and approved by DSA, in accordance with the requirements of the California Code of Regulations, Title 24 will be assigned to the work. His duties are specifically defined in Title 24, Part I, Sec. 4-342.
- b. The work of construction in all stages of progress shall be subject to the personal continuous observation of the Inspector. He shall have free access to any or all parts of the work at any time. The Contractor shall furnish the Inspector reasonable facilities for obtaining such information as may be necessary to keep him fully informed respecting the progress and manner of the work and the character of materials. Inspection of the work shall not relieve the Contractor from any obligation to fulfill this contract.

6. Inspector – Owner – Field Office: The Contractor shall provide for the use of the Owner's Inspector a temporary office to be located as directed by the Inspector and to be maintained until removal is authorized by the Owner. This office shall of substantial water proof construction with adequate natural light and ventilation by means of stock design windows. The door shall have a lock. A table satisfactory for the study of plans and two chairs shall be provided by the Contractor. The Contractor shall provide and pay for adequate electric lights, private local telephone service with a loud exterior bell, and adequate heat for this field office until the completion of the Contract.

1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Engineer.
- C. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
- D. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- E. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

- F. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- H. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- I. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of 5 previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Engineer for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Engineer for a decision before proceeding.

1.5 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Reports shall be prepared by the person performing the testing and inspecting. Include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Identification of product and Specification Section.
 - 8. Complete test or inspection data.
 - 9. Test and inspection results and an interpretation of test results.

10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and reinspecting.
- B. Governing Agency Verified Reports: Complete and submit Verified Reports as required by the Division of the State Architect and the 2019 California Administrative Code, Section 4-336. Reports are required to be completed by the Engineers, Owner's Inspector of Record, Contractor, and Testing Agency.
1. Form:
 - a. DSA form DSA-6C for Contractor.
 - b. DSA form DSA-6PI for Project Inspector.
 - c. DSA form DSA-6A/E for Engineer and consulting Engineers.
- C. Manufacturer's Technical Representative's Field Reports: Provide written report documenting tests and inspections specified in other Sections. Reports shall be prepared by Manufacturer's technical representative performing the testing and inspecting. Include the following:
1. Name, address, and telephone number of technical representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- D. Factory-Authorized Service Representative's Reports: Provide written report documenting tests and inspections specified in other Sections. Reports shall be prepared by Factory-authorized service representative performing the testing and inspecting. Include the following:
1. Name, address, and telephone number of factory-authorized service representative making report.
 2. Statement that equipment complies with requirements.
 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 4. Statement whether conditions, products, and installation will affect warranty.
 5. Other required items indicated in individual Specification Sections.
- E. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar

documents, established for compliance with standards and regulations bearing on performance of the Work.

1.6 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. 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, as well as sufficient production capacity to produce required units.
- C. 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.
- D. 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.
- E. Professional Engineer Qualifications: A professional engineer who is legally licensed to practice in the state 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 product that are similar in material, design, and extent to those indicated for this Project.
- F. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
 - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- G. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- H. 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.
- I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

1. Contractor responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
 - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - f. When testing is complete, remove test specimens, assemblies, and mockups; do not reuse products on Project.
2. Testing Agency Responsibilities: Submit a written report of each test, inspection, and similar quality-assurance service to Engineer, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

1.7 INSPECTOR OF RECORD

- A. General: Owner will employ an Inspector of Record (IOR) for continuous inspection of the Work. Inspector of Record shall be acceptable to Engineer and approved by the Division of the State Architect.
 1. Inspector of Record shall act under the direction of the Engineer and shall be subject to supervision by a representative of the Division of the State Architect.
- B. Qualifications for Inspector of Record: Qualifications for the Inspector of Record shall be as stated in the California Code of Regulations, Title 24, Part 1, 2019 California Administrative Code, Section 4-333.1. Inspector of Record shall be DSA certified under one of the following classes:
 1. Class 1: May inspect any project.
 2. Class 2: May inspect any project except a project containing one or more new large structures with a primary lateral load resisting system of steel, masonry, or concrete.
 3. Class 3: May inspect projects containing alterations to approved buildings, site placement of relocatable buildings, and construction of minor structures.
 4. Class 4: May inspect site placement of relocatable buildings and associated site work.
- C. Duties of the Inspector of Record: Duties of the Inspector of Record shall be as stated in the California Code of Regulations, Title 24, Part 1, 2019 California Administrative Code, Sections 4-333(b) and 4-342, and include the following:
 1. Provide continuous inspection of the work.

2. Maintain files and records of approved plans and specifications including addenda and change orders.
3. Prepare semi-monthly reports of the progress of the work and submit copies to the Engineer and the Division of the State Architect.
4. Notify the Division of the State Architect at the following times:
 - a. At the start of construction of the project or restart of construction if work has suspended for a period of 2 or more weeks.
 - b. At least 48 hours in advance of the time when foundation trenches will be complete, ready for footing forms.
 - c. At least 48 hours in advance of the first placement of foundation concrete and 24 hours in advance of any subsequent or significant concrete placement.
 - d. When all work on the project has been suspended for a period of more than 2 weeks.
5. Prepare and maintain records of certain phases of construction including but not limited to the following:
 - a. Concrete placing operations. Show date and time of placing concrete and the time and date of removal of forms in each portion of the structure.
 - b. Welding operations. The record shall include identification marks of welders, lists of defective welds, and manner of correction of defects.
6. Notify the Contractor, in writing, of any deviations from the approved construction documents.
7. Prepare and submit IOR's Verified Report as required by DSA.

1.8 TESTING AGENCY

- A. General: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to conduct tests and inspections required by authorities having jurisdiction. Testing agency shall be acceptable to Engineer and the Division of the State Architect. Requirements for tests and testing agency shall be as stated in the California Code of Regulations, Title 24, Part 1, 2019 California Administrative Code, Section 4-335.
 1. Costs for testing agency services will be paid by the Owner.
 2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be paid by the Owner and the amount will be deducted from the Contract Sum by Change Order.
- B. Testing Agency Responsibilities: Cooperate with Engineer and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
 1. Perform testing as required by the Contract Documents.
 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.

3. Taking all test specimens.
4. Prepare written reports of tests and inspections, and submit reports of each test, inspection, and similar quality-control service to Engineer, Division of the State Architect, and Contractor.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Notify Engineer and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
7. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
8. Retesting and reinspecting corrected work.
9. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
10. Do not perform any duties of Contractor.

1.9 CONTRACTOR REQUIREMENTS

- A. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
 7. Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 - a. Access to the Work.
 - b. Incidental labor and facilities necessary to facilitate tests and inspections.
 - c. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 - d. Facilities for storage and field curing of test samples.

- e. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 - f. Security and protection for samples and for testing and inspecting equipment at Project site.
- 8. Coordinate sequence of activities to accommodate required quality-assurance and control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
 - a. Schedule times for tests, inspections, obtaining samples, and similar activities.
- B. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."
- C. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

1.10 TESTS AND INSPECTIONS

- A. Structural Tests and Inspections shall be as specified in Division 02 through 33 Sections for specific materials and as required by form DSA-103 which lists tests and inspections required by DSA as applicable to Project conditions.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
 - 1. Date test or inspection was conducted.
 - 2. Description of the Work tested or inspected.
 - 3. Date test or inspection results were transmitted to Engineer.
 - 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Engineer's reference during normal working hours.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Division 01 Section "Execution."
- 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

SECTION 014200
REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Engineer's action on Contractor's submittals, applications, and requests, "approved" is limited to Engineer's duties and responsibilities as stated in the Conditions of the Contract. Engineer's approval does not release the Contractor from the responsibility to fulfill Contract requirements.
- C. "Directed": A command or instruction by Engineer. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and

effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

- 1. AABC - Associated Air Balance Council; www.aabc.com.
- 2. AAMA - American Architectural Manufacturers Association; www.aamanet.org.
- 3. AAPFCO - Association of American Plant Food Control Officials; www.aapfco.org.
- 4. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
- 5. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
- 6. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
- 7. ABMA - American Boiler Manufacturers Association; www.abma.com.
- 8. ACI - American Concrete Institute; (Formerly: ACI International); www.abma.com.
- 9. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
- 10. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
- 11. AF&PA - American Forest & Paper Association; www.afandpa.org.
- 12. AGA - American Gas Association; www.aga.org.
- 13. AHAM - Association of Home Appliance Manufacturers; www.aham.org.
- 14. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
- 15. AI - Asphalt Institute; www.asphaltinstitute.org.
- 16. AIA - American Institute of Architects (The); www.aia.org.
- 17. AISC - American Institute of Steel Construction; www.aisc.org.
- 18. AISI - American Iron and Steel Institute; www.steel.org.
- 19. AITC - American Institute of Timber Construction; www.aitc-glulam.org.
- 20. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
- 21. ANSI - American National Standards Institute; www.ansi.org.
- 22. AOSA - Association of Official Seed Analysts, Inc.; www.aosaseed.com.
- 23. APA - APA - The Engineered Wood Association; www.apawood.org.

24. APA - Architectural Precast Association; www.archprecast.org.
25. API - American Petroleum Institute; www.api.org.
26. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
27. ARI - American Refrigeration Institute; (See AHRI).
28. ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
29. ASCE - American Society of Civil Engineers; www.asce.org.
30. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
31. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
32. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
33. ASSE - American Society of Safety Engineers (The); www.asse.org.
34. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
35. ASTM - ASTM International; www.astm.org.
36. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
37. AWEA - American Wind Energy Association; www.awea.org.
38. AWI - Architectural Woodwork Institute; www.awinet.org.
39. AWMAC - Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
40. AWPA - American Wood Protection Association; www.awpa.com.
41. AWS - American Welding Society; www.aws.org.
42. AWWA - American Water Works Association; www.awwa.org.
43. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
44. BIA - Brick Industry Association (The); www.gobrick.com.
45. BICSI - BICSI, Inc.; www.bicsi.org.
46. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.org.
47. BISSC - Baking Industry Sanitation Standards Committee; www.bissc.org.
48. BWF - Badminton World Federation; (Formerly: International Badminton Federation); www.bissc.org.
49. CDA - Copper Development Association; www.copper.org.
50. CEA - Canadian Electricity Association; www.electricity.ca.
51. CEA - Consumer Electronics Association; www.ce.org.
52. CFFA - Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.
53. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
54. CGA - Compressed Gas Association; www.cganet.com.
55. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
56. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
57. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
58. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
59. CPA - Composite Panel Association; www.pbmdf.com.
60. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
61. CRRC - Cool Roof Rating Council; www.coolroofs.org.
62. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
63. CSA - Canadian Standards Association; www.csa.ca.
64. CSA - CSA International; (Formerly: IAS - International Approval Services); www.csa-international.org.
65. CSI - Construction Specifications Institute (The); www.csinet.org.

66. CSSB - Cedar Shake & Shingle Bureau; www.cedarbureau.org.
67. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
68. CWC - Composite Wood Council; (See CPA).
69. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
70. DHI - Door and Hardware Institute; www.dhi.org.
71. ECA - Electronic Components Association; (See ECIA).
72. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
73. ECIA - Electronic Components Industry Association; www.eciaonline.org.
74. EIA - Electronic Industries Alliance; (See TIA).
75. EIMA - EIFS Industry Members Association; www.eima.com.
76. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
77. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org.
78. ESTA - Entertainment Services and Technology Association; (See PLASA).
79. EVO - Efficiency Valuation Organization; www.evo-world.org.
80. FCI - Fluid Controls Institute; www.fluidcontrolsinstitute.org.
81. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.
82. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
83. FM Approvals - FM Approvals LLC; www.fmglobal.com.
84. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
85. FRSA - Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; www.floridarroof.com.
86. FSA - Fluid Sealing Association; www.fluidsealing.com.
87. FSC - Forest Stewardship Council U.S.; www.fscus.org.
88. GA - Gypsum Association; www.gypsum.org.
89. GANA - Glass Association of North America; www.glasswebsite.com.
90. GS - Green Seal; www.greenseal.org.
91. HI - Hydraulic Institute; www.pumps.org.
92. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
93. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
94. HPVA - Hardwood Plywood & Veneer Association; www.hpva.org.
95. HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.
96. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
97. IAS - International Accreditation Service; www.iasonline.org.
98. IAS - International Approval Services; (See CSA).
99. ICBO - International Conference of Building Officials; (See ICC).
100. ICC - International Code Council; www.iccsafe.org.
101. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
102. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
103. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
104. IEC - International Electrotechnical Commission; www.iec.ch.
105. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
106. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
107. IESNA - Illuminating Engineering Society of North America; (See IES).

108. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
109. IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.
110. IGSHPA - International Ground Source Heat Pump Association; www.igshpa.okstate.edu.
111. ILI - Indiana Limestone Institute of America, Inc.; www.ili.ai.com.
112. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
113. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
114. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
115. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
116. ISO - International Organization for Standardization; www.iso.org.
117. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
118. ITU - International Telecommunication Union; www.itu.int/home.
119. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.
120. LMA - Laminating Materials Association; (See CPA).
121. LPI - Lightning Protection Institute; www.lightning.org.
122. MBMA - Metal Building Manufacturers Association; www.mbma.com.
123. MCA - Metal Construction Association; www.metalconstruction.org.
124. MFMA - Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
125. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
126. MHIA - Material Handling Industry of America; www.mhia.org.
127. MIA - Marble Institute of America; www.marble-institute.com.
128. MMPA - Moulding & Millwork Producers Association; www.wmmpa.com.
129. MPI - Master Painters Institute; www.paintinfo.com.
130. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
131. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
132. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
133. NADCA - National Air Duct Cleaners Association; www.nadca.com.
134. NAIMA - North American Insulation Manufacturers Association; www.naima.org.
135. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
136. NBI - New Buildings Institute; www.newbuildings.org.
137. NCAA - National Collegiate Athletic Association (The); www.ncaa.org.
138. NCMA - National Concrete Masonry Association; www.ncma.org.
139. NEBB - National Environmental Balancing Bureau; www.nebb.org.
140. NECA - National Electrical Contractors Association; www.necanet.org.
141. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
142. NEMA - National Electrical Manufacturers Association; www.nema.org.
143. NETA - InterNational Electrical Testing Association; www.netaworld.org.
144. NFHS - National Federation of State High School Associations; www.nfhs.org.
145. NFPA - National Fire Protection Association; www.nfpa.org.
146. NFPA - NFPA International; (See NFPA).
147. NFRC - National Fenestration Rating Council; www.nfrc.org.
148. NHLA - National Hardwood Lumber Association; www.nhla.com.
149. NLGA - National Lumber Grades Authority; www.nlga.org.
150. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).

151. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
152. NRCA - National Roofing Contractors Association; www.nrca.net.
153. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
154. NSF - NSF International; www.nsf.org.
155. NSPE - National Society of Professional Engineers; www.nspe.org.
156. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
157. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
158. NWFA - National Wood Flooring Association; www.nwfa.org.
159. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
160. PDI - Plumbing & Drainage Institute; www.pdionline.org.
161. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); www.plasa.org.
162. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
163. RFCI - Resilient Floor Covering Institute; www.rfci.com.
164. RIS - Redwood Inspection Service; www.redwoodinspection.com.
165. SAE - SAE International; www.sae.org.
166. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.
167. SDI - Steel Deck Institute; www.sdi.org.
168. SDI - Steel Door Institute; www.steeldoor.org.
169. SEFA - Scientific Equipment and Furniture Association (The); www.sefalabs.com.
170. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
171. SIA - Security Industry Association; www.siaonline.org.
172. SJI - Steel Joist Institute; www.steeljoist.org.
173. SMA - Screen Manufacturers Association; www.smainfo.org.
174. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
175. SMPTE - Society of Motion Picture and Television Engineers; www.smpte.org.
176. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
177. SPIB - Southern Pine Inspection Bureau; www.spib.org.
178. SPRI - Single Ply Roofing Industry; www.spri.org.
179. SRCC - Solar Rating & Certification Corporation; www.solar-rating.org.
180. SSINA - Specialty Steel Industry of North America; www.ssina.com.
181. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
182. STI - Steel Tank Institute; www.steeltank.com.
183. SWI - Steel Window Institute; www.steelwindows.com.
184. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
185. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
186. TCNA - Tile Council of North America, Inc.; www.tileusa.com.
187. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
188. TIA - Telecommunications Industry Association (The); (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
189. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
190. TMS - The Masonry Society; www.masonrysociety.org.
191. TPI - Truss Plate Institute; www.tpinst.org.
192. TPI - Turfgrass Producers International; www.turfgrasssod.org.
193. TRI - Tile Roofing Institute; www.tilerroofing.org.

194. UL - Underwriters Laboratories Inc.; www.ul.com.
195. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.
196. USAV - USA Volleyball; www.usavolleyball.org.
197. USGBC - U.S. Green Building Council; www.usgbc.org.
198. USITT - United States Institute for Theatre Technology, Inc.; www.usitt.org.
199. WASTEC - Waste Equipment Technology Association; www.wastec.org.
200. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
201. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
202. WDMA - Window & Door Manufacturers Association; www.wdma.com.
203. WI - Woodwork Institute; www.wicnet.org.
204. WSRCA - Western States Roofing Contractors Association; www.wsrca.com.
205. WWPA - Western Wood Products Association; www.wwpa.org.

B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.

1. DIN - Deutsches Institut fur Normung e.V.; www.din.de.
2. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
3. ICC - International Code Council; www.iccsafe.org.
4. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.

1. COE - Army Corps of Engineers; www.usace.army.mil.
2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
4. DOD - Department of Defense; www.quicksearch.dla.mil.
5. DOE - Department of Energy; www.energy.gov.
6. EPA - Environmental Protection Agency; www.epa.gov.
7. FAA - Federal Aviation Administration; www.faa.gov.
8. FG - Federal Government Publications; www.gpo.gov.
9. GSA - General Services Administration; www.gsa.gov.
10. HUD - Department of Housing and Urban Development; www.hud.gov.
11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; www.eetd.lbl.gov.
12. OSHA - Occupational Safety & Health Administration; www.osha.gov.
13. SD - Department of State; www.state.gov.
14. TRB - Transportation Research Board; National Cooperative Highway Research Program; The National Academies; www.trb.org.
15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
16. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
17. USDJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.

18. USP - U.S. Pharmacopeial Convention; www.usp.org.
19. USPS - United States Postal Service; www.usps.com.

D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
2. DOD - Department of Defense; Military Specifications and Standards; Available from DLA Document Services; www.quicksearch.dla.mil.
3. DSCC - Defense Supply Center Columbus; (See FS).
4. FED-STD - Federal Standard; (See FS).
5. FS - Federal Specification; Available from DLA Document Services; www.quicksearch.dla.mil.
 - a. Available from Defense Standardization Program; www.dsp.dla.mil.
 - b. Available from General Services Administration; www.gsa.gov.
 - c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org/ccb.
6. MILSPEC - Military Specification and Standards; (See DOD).
7. USAB - United States Access Board; www.access-board.gov.
8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

E. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CBHF; State of California; Department of Consumer Affairs; Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation; www.bearhfti.ca.gov.
2. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; www.calregs.com.
3. CDHS; California Department of Health Services; (See CDPH).
4. CDPH; California Department of Public Health; Indoor Air Quality Program; www.cal-iaq.org.
5. CPUC; California Public Utilities Commission; www.cpuc.ca.gov.
6. SCAQMD; South Coast Air Quality Management District; www.aqmd.gov.
7. TFS; Texas A&M Forest Service; Sustainable Forestry and Economic Development; www.txforestservice.tamu.edu.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 015116
FIRE SAFETY DURING CONSTRUCTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes requirements for fire safety during construction and demolition.
- B. Related Sections:
 - 1. Division 01 Section "Temporary Facilities and Controls" for additional facilities, requirements, and procedures required during construction.

1.3 SUBMITTALS

- A. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

1.4 REGULATORY REQUIREMENTS

- A. Regulatory Requirements: Comply with applicable provisions of the following:
 - 1. NFPA 241.
 - 2. California Fire Code, 2019 Edition, Chapter 33 "Fire Safety During Construction and Demolition" and the 2019 Editions of the following California Codes as Referenced by the California Fire Code:
 - a. California Building Code (CBC).
 - b. California Mechanical Code (CMC).
 - c. California Plumbing Code (CPC).
 - d. California Electrical Code (CEC).
- B. Temporary Heating Equipment (CFC 3303):
 - 1. General: Temporary heating devices shall be listed and labeled in accordance with the California Mechanical Code. Installation, maintenance and use of temporary heating devices shall be in accordance with the terms of the listing.

2. LP-Gas heaters: Heating devices shall be temporary, self-contained, liquid-propane-gas heaters with individual space thermostatic control. Fuel supplies for liquefied petroleum gas fired heaters shall comply with the California Fire Code, Chapter 61 Liquefied Petroleum Gases, and the California Mechanical Code.
3. Refueling: Refueling operations for liquid fueled equipment or appliances shall be conducted in accordance with the California Fire Code, Section 5705. The equipment or appliance shall be allowed to cool prior to refueling.
4. Installation: Clearance to combustibles from temporary heating devices shall be maintained in accordance with the labeled equipment. When in operation, temporary heating devices shall be fixed in place and protected from damage, dislodgement or overturning in accordance with the manufacturer's instructions.
5. Supervision: The use of temporary heating devices shall be supervised and maintained only by competent personnel.
6. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.

C. Precautions Against Fire (CFC 3304):

1. Smoking: Smoking shall not be allowed on the project site.
2. Combustible Debris, Rubbish and Waste:
 - a. Combustible debris, rubbish and waste shall not be accumulated within buildings.
 - b. Combustible debris, rubbish and waste material shall be removed from buildings at the end of each shift of work.
 - c. Rubbish containers with a capacity exceeding 5.33 cubic feet (40 gallons) used for temporary storage of combustible debris, rubbish and waste materials, shall have tight fitting or self-closing lids. Such containers shall be constructed entirely of materials that are non-combustible or materials that meet a peak rate of heat release not exceeding 300 kW/m² when tested in accordance with ASTM E 1354 at an incident heat flux of 50 kW/m² in the horizontal orientation.
 - d. Materials susceptible to spontaneous ignition, such as oily rags, shall be stored in a listed disposal container.
3. Burning: Burning of materials shall not be allowed on the project site.
4. Fire Watch: Where required by the fire code official, a fire watch shall be provided for building demolition and for building construction during working hours that is hazardous in nature, such as temporary heating or hot work.
 - a. Trained personnel shall be provided to serve as an on-site fire watch. Fire watch personnel shall be provided with not less than one approved means for notification of the fire department, and the sole duty of such personnel shall be to perform constant patrols and watch for the occurrence of fire. The combination of fire watch duties and site security is acceptable. Fire watch personnel shall be trained in the use of portable fire extinguishers.
 - b. The fire watch personnel shall keep a record of all time periods of duty, including a log entry each time the site was patrolled, and each time a structure under construction was entered and inspected. The records and log entries shall be made available for review by the fire code official upon request.

5. Cutting and Welding: Welding, cutting, open torches, and other hot work operations and equipment shall comply with California Fire Code, Chapter 35 "Welding and Other Hot Work."
 6. Temporary Wiring for Electrical Power: Temporary wiring for electrical power and lighting installations used in connection with the construction, alteration or demolition of buildings, structures, equipment or similar activities shall comply with the California Electrical Code.
- D. Flammable and Combustible Liquids (CFC 3305):
1. Storage of Flammable and Combustible Liquids: Storage of flammable and combustible liquids shall be in accordance with the California Fire Code, Section 5704.
 2. Class I and Class II Liquids: Storage, use, and handling of flammable and combustible liquids at construction sites shall be in accordance with the California Fire Code, Section 5706.2. Ventilation shall be provided for operations involving the application of materials containing flammable solvents.
 3. Housekeeping: Flammable and combustible liquid storage areas shall be maintained clear of combustible vegetation and waste materials. Such storage areas shall not be used for the storage of combustible materials.
 4. Precautions Against Fire: Sources of ignition and smoking shall be prohibited in flammable and combustible liquid storage areas. Signs shall be posted in accordance the California Fire Code, Section 310.
 5. Handling at Point of Final Use: Class I and Class II liquids shall be kept in approved safety containers.
 6. Leakage and Spills: Leaking vessels shall be immediately repaired or taken out of service and spills shall be cleaned up and disposed of properly.
- E. Flammable Gases (CFC 3306):
1. Storage and Handling: Storage and handling of flammable gasses shall comply with the California Fire Code, Chapter 58 "Flammable Gases and Flammable Cryogenic Fluids."
 2. Cleaning with Flammable Gases: Flammable gases shall not be used to clean or remove debris from piping open to the atmosphere.
- F. Explosive Materials (CFC 3307): Explosive materials shall not be allowed.
- G. Owner's Responsibility for Fire Protection (CFC 3308)
1. Program Development: The Contractor shall be responsible for the development, implementation and maintenance of a written plan establishing a fire prevention program at the project site applicable throughout all phases of the construction.
 2. Program Superintendent: The Contractor shall a person to be the Fire Prevention Program Superintendent who shall be responsible for the fire prevention program and ensure that it is carried out through completion of the project. The fire prevention program superintendent shall have the authority to enforce the provisions of the California Fire Code, Chapter 33, and other provisions as necessary to secure the intent of the California Fire Code, Chapter 33. Where guard service is provided in accordance with NFPA 241, the superintendent shall be responsible for the guard service.

3. Prefire Plans: The fire prevention program superintendent shall develop and maintain an approved prefire plan in cooperation with the fire chief. The fire chief and the fire code official shall be notified of changes affecting the utilization of information contained in such prefire plans.
4. Training: Training of responsible personnel in the use of fire protection equipment shall be the responsibility of the fire prevention program superintendent. Records of training shall be kept and made a part of the written plan for the fire prevention program.
5. Fire Protection Devices: The fire prevention program superintendent shall determine that all fire protection equipment is maintained and serviced in accordance with the California Fire Code. The quantity and type of fire protection equipment shall be approved. Fire protection equipment shall be inspected in accordance with the fire prevention program.
6. Hot Work Operations: The fire prevention program superintendent shall be responsible for supervising the permit system for hot work operations in accordance with the California Fire Code, Chapter 35.
7. Impairment of Fire Protection Systems: Impairments to any fire protection system shall be in accordance with the California Fire Code, Section 901.
 - a. Smoke detectors and smoke alarms located in an area where airborne construction dust is expected shall be covered to prevent exposure to dust or shall be temporarily removed. smoke detectors and alarms that were removed shall be replaced upon conclusion of dust producing work. Smoke detectors and smoke alarms that were covered shall be inspected and cleaned, as necessary, upon conclusion of dust producing work.
8. Temporary Covering of Fire Protection Devices: Temporary coverings placed on or over fire protection devices to protect them from damage during construction processes shall be immediately removed upon the completion of the construction processes in the room or area in which the devices are installed.

H. Fire Reporting (CFC 3309)

1. Emergency Telephone: Emergency telephone facilities with ready access shall be provided in an approved location at the construction site, or an approved equivalent means of communication shall be provided. The street address of the construction site and the emergency telephone number of the fire department shall be posted adjacent to the telephone. Alternatively, where an equivalent means of communication has been approved, the site address and fire department emergency telephone number shall be posted at the main entrance to the site, in guard shacks, and in the construction site office.

I. Access for Fire Fighting (CFC 3310):

1. Required Access: Approved vehicle access for firefighting shall be provided to all construction or demolition sites. Vehicle access shall be provided to within 100 feet of temporary or permanent fire department connections. Vehicle access shall be provided by either temporary or permanent roads capable of supporting vehicle loading under all weather conditions. Vehicle access shall be maintained until permanent fire apparatus access roads are available.

2. Key Boxes: Key boxes shall be provided as required by the California Fire Code, Chapter 5 "Fire Service Features."

J. Means of Egress (CFC 3311):

1. Stairways Required: (Requirements not applicable to buildings less than 50 feet in height or less than four stories).
2. Means of Egress: Required means of egress and required accessible means of egress shall be maintained during construction and demolition, remodeling or alterations and additions to any building unless an approved temporary means of egress system is provided.

K. Water Supply for Fire Protection (CFC 3312):

1. Water Supply for Fire Protection: An approved water supply for fire protection, either temporary or permanent, shall be made available as soon as combustible material arrives on site.

L. Standpipes (CFC 3313):

1. Where Required: In buildings required to have standpipes by California Fire Code Section 905.3.1, not less than one standpipe shall be provided for use during construction. Such standpipes shall be installed prior to construction exceeding 40 feet in height above the lowest level of fire department vehicle access. Such standpipes shall be provided with fire department hose connections at locations adjacent to stairways complying with California Fire Code Section 3311.11. As construction progresses, such standpipes shall be extended to within one floor of the highest point of construction having secured decking or flooring.
2. Buildings Being Demolished: Where a building is being demolished and a standpipe is existing within such a building, such standpipe shall be maintained in an operable condition so as to be available for use by the fire department. Such standpipe shall be demolished with the building but shall not be demolished more than one floor below the floor being demolished.
3. Detailed Requirements: Standpipes shall be installed in accordance with the provisions of California Fire Code Section 905.
 - a. Standpipes shall be either temporary or permanent in nature, and with or without a water supply, provided that such standpipes comply with the requirements of California Fire Code Section 905 as to capacity, outlets and materials.

M. Automatic Sprinkler System (CFC 3314):

1. Completion Before Occupancy: In buildings where an automatic sprinkler system is required by the California Fire Code or California Building Code, it shall be unlawful to occupy any portion of a building or structure until the automatic sprinkler system installation has been tested and approved, except as provided in California Fire Code Section 105.3.4.

2. Operation of Valves: In buildings where an automatic sprinkler system is provided, operation of sprinkler control valves shall be allowed only by properly authorized personnel and shall be accompanied by notification of duly designated parties. Where the sprinkler protection is being regularly turned off and on to facilitate connection of newly completed segments, the sprinkler control valves shall be checked at the end of each work period to ascertain that protection is in service.

N. Portable Fire Extinguishers (CFC 3315):

1. Portable Fire Extinguishers: Structures under construction, alteration or demolition shall be provided with not less than one approved portable fire extinguisher in accordance with the California Fire Code, Section 906 and sized for not less than ordinary hazard, as follows:
 - a. At each stairway on all floor levels where combustible materials have accumulated.
 - b. In every storage and construction shed.
 - c. Additional portable fire extinguishers shall be provided where special hazards exist including, but not limited to, the storage and use of flammable and combustible liquids.

O. Motorized Construction Equipment (CFC 3316):

1. Conditions of Use: Internal combustion powered construction equipment shall be used in accordance with all of the following conditions:
 - a. Equipment shall be located so that exhausts do not discharge against combustible material.
 - b. Exhausts shall be piped to the outside of the building.
 - c. Equipment shall not be refueled while in operation.
 - d. Fuel for equipment shall be stored in approved areas outside of the building.

P. Safeguarding Roofing Operations (CFC 3317):

1. General: Roofing operations utilizing heat producing systems or other ignition sources shall be conducted in accordance with California Fire Code Sections 3317.2 and 3317.3, and Chapter 35.
2. Asphalt and Tar Kettles: Asphalt and tar kettles shall be operated in accordance with the California Fire Code, Section 303.
3. Fire Extinguishers for Roofing Operations: Fire extinguishers shall comply with the California Fire Code, Section 906. There shall be not less than one multi-purpose portable fire extinguisher with a minimum 3-A 40-B:C rating on the roof being covered or repaired.

PART 2 - PRODUCTS

2.1 TEMPORARY EQUIPMENT, GENERAL

- A. Temporary Equipment: Temporary equipment shall comply with requirements of Division 01 Section "Temporary Facilities and Controls," and shall comply with the requirements of this Section.

PART 3 - EXECUTION

- A. Fire Safety Observation, Procedures, and Features: Provide fire safety observation activities, procedures, and features as required and in compliance with regulatory requirements.

END OF SECTION

SECTION 016000
PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Requirements:
 - 1. Division 01 Section "Substitution Procedures" for requests for substitutions.

1.3 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, which is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Products: Products of a listed manufacturer that are demonstrated to meet or exceed the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified 'Basis of Design' product.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.4 SUBMITTALS

- A. Product Submittals: Comply with requirements in Division 01 Section "Submittal Procedures" and submittal requirements of Division 02 through 33 Sections to show compliance with product requirements.

1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
 - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - 4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
- C. Storage:
 - 1. Store products to allow for inspection and measurement of quantity or counting of units.
 - 2. Store materials in a manner that will not endanger Project structure.
 - 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 - 4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 - 5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 - 6. Protect stored products from damage and liquids from freezing.

1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 - 1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 - 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
 - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 - 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
 - 3. See Divisions 02 through 33 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Warranty Submittals: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
 - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 - 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 - 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 - 4. Where products are accompanied by the term "as selected," Engineer will make selection.
 - 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

B. Product Selection Procedures:

1. Restricted List: Where Specifications include the phrase “provide one of the following” or similar phrase and lists 2 or more manufacturers and/or products, provide one of the products indicated. Comply with requirements in Division 01 Section "Substitution Procedures" for consideration of an unnamed manufacturer or product.
2. Non-restricted List: Where Specifications include the phrase “includes, but are not limited to the following” or similar phrase, provide one of the products indicated or an unnamed product that complies with requirements indicated.
3. Basis of Design: Where Specifications include the phrase “Basis of Design” and lists a named manufacturer and product, provide the product indicated.
 - a. Where a “Comparable” product of listed manufacturers is indicated following a “Basis of Design” manufacturer/product, a comparable product of one of the listed manufacturers may be provided in lieu of the basis of design manufacturer/product subject to compliance with product requirements and the following:
 - 1) Evidence that the proposed product:
 - a) Does not require revisions to the Contract Documents.
 - b) Is consistent with the Contract Documents and will produce the indicated results.
 - c) Is compatible with other portions of the Work.
 - 2) Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - 3) Evidence that proposed product provides specified warranty.
 - b. Where no “Comparable” manufacturers/products are indicated following a “Basis of Design” manufacturer/product, comply with requirements in Division 01 Section "Substitution Procedures" for consideration of an unnamed manufacturer or product.

C. Visual Matching Specification: Where Specifications require "match Engineer's sample", provide a product that complies with requirements and matches Engineer's sample. Engineer's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Division 01 Section "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Engineer from manufacturer's full range" or similar phrase, select a product that complies with requirements. Engineer will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

PART 3 - EXECUTION

3.1 PRODUCT INSTALLATION

- A. General: Install products in accordance with Drawings, Specifications, and product manufacturer's written installation instructions. Installation shall include examination of conditions and preparations necessary for proper installation.

END OF SECTION

SECTION 017300
EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. Installation of the Work.
 - 4. Cutting, patching and repairing.
 - 5. Coordination of Owner-installed products.
 - 6. Progress cleaning.
 - 7. Starting and adjusting.
 - 8. Protection of installed construction.
 - 9. Correction of the Work.
- B. Related Requirements:
 - 1. Division 01 Section "Summary of Work" for limits on use of Project site.
 - 2. Division 01 Section "Submittal Procedures" for submitting surveys.
 - 3. Division 02 Section "Selective Demolition" for demolition and removal of selected portions of the building.

1.3 DEFINITIONS

- A. Accessible Route: A continuous unobstructed path connecting accessible elements and spaces of an accessible site, building or facility that can be negotiated by a person with a disability using wheelchair, and that is also safe for and usable by persons with other disabilities. Interior accessible routes may include corridors, hallways, floors, ramps, elevators, and lifts. Exterior accessible routes may include accessible parking stalls and access aisles, curb ramps, crosswalks at vehicular ways, walks, ramps, and lifts.
- B. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- C. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.4 QUALITY ASSURANCE

- A. Surveyor Qualifications: A professional engineer or land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
- B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
 - 1. Structural Elements: When cutting of structural elements must be performed, notify Engineer of locations and details of cutting and await directions from Engineer before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
 - 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:
 - a. Primary operational systems and equipment.
 - b. Fire separation assemblies.
 - c. Air or smoke barriers.
 - d. Fire-suppression systems.
 - e. Mechanical systems piping and ducts.
 - f. Control systems.
 - g. Communication systems.
 - h. Fire-detection and alarm systems.
 - i. Conveying systems.
 - j. Electrical wiring systems.
 - k. Operating systems of special construction.
 - 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
 - a. Water, moisture, or vapor barriers.
 - b. Membranes and flashings.
 - c. Sprayed fire-resistive material.
 - d. Equipment supports.
 - e. Piping, ductwork, vessels, and equipment.
 - 4. Visual Elements: Cut and patch construction in a manner that results in no visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Engineer's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

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

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in Division 02 through 33 Sections.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Engineer for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

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

2. List of detrimental conditions, including substrates.
 3. List of unacceptable installation tolerances.
 4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Engineer according to requirements in Division 01 Section "Request for Information."

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Engineer promptly.
- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 2. Establish limits on use of Project site.
 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 4. Inform installers of lines and levels to which they must comply.
 5. Check the location, level and plumb, of every major element as the Work progresses.
 6. Notify Engineer when deviations from required lines and levels exceed allowable tolerances.
 7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Engineer.

3.4 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
 - 4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- G. Templates: Obtain and distribute to the parties' involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately

located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Engineer.
 2. Allow for building movement, including thermal expansion and contraction.
 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.5 CUTTING, PATCHING, AND REPAIRING

- A. Cutting, Patching and Repairing, General: Employ skilled workers to perform cutting, patching, and/or repairing. Proceed with cutting, patching, and repairing at the earliest feasible time, and complete without delay.
1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Division 01 Section "Summary."
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.
 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 6. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching and Repairing: Patch and repair construction by grinding, filling, leveling, refinishing, closing up, and similar operations following performance of other work. Provide materials and comply with installation requirements specified in other Sections, where applicable.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched and repaired areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 - b. Where finishes have been removed, patch and repair substrates to receive new finishes; substrates shall be prepared to comply with requirements of manufacturer of final finish material.
 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

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

3.6 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction personnel.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.
 1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
 2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.7 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Division 01 Section "Construction Waste Management and Disposal."
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with requirements in Division 01 Section "General Commissioning Requirements."
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Manufacturer's Field Service: Comply with qualification requirements in Division 01 Section "Quality Requirements."

3.9 PROTECTION OF INSTALLED CONSTRUCTION

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

END OF SECTION

SECTION 017419
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Salvaging nonhazardous construction and demolition waste.
 - 2. Recycling nonhazardous construction and demolition waste.
 - 3. Disposing of nonhazardous construction and demolition waste.
- B. Related Requirements:
 - 1. Division 02 Section "Structure Demolition" for disposition of waste resulting from demolition of buildings, structures, and site improvements.
 - 2. Division 02 Section "Selective Demolition" for disposition of waste resulting from partial demolition of buildings, structures, and site improvements.

1.3 DEFINITIONS

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

1.4 MATERIALS OWNERSHIP

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

1.5 ACTION SUBMITTALS

- A. Waste Management Plan: Submit Waste Management Plan within 30 days of date established for the Notice to Proceed indicating method of compliance with the California Green Building Standards Code.

1.6 INFORMATIONAL SUBMITTALS

- A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Use separate forms for construction waste and demolition waste. Include the following information:
 - 1. Material category.
 - 2. Generation point of waste.
 - 3. Total quantity of waste in tons.
 - 4. Quantity of waste salvaged, both estimated and actual in tons.
 - 5. Quantity of waste recycled, both estimated and actual in tons.
 - 6. Total quantity of waste recovered (salvaged plus recycled) in tons.
 - 7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
- B. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.
- C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- D. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- E. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- F. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- G. Qualification Data: For waste management coordinator and refrigerant recovery technician.
- H. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was

recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.7 QUALITY ASSURANCE

- A. Waste Management Coordinator Qualifications: Experienced firm, or individual employee assigned by the General Contractor, with a record of successful waste management coordination of projects with similar requirements. Individual of firm, or Contractor's employee, shall be a LEED-Accredited Professional, certified by the USGBC, as waste management coordinator.
- B. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- C. Regulatory Requirements: Comply with transportation and disposal regulations of authorities having jurisdiction.
- D. Waste Management Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:
 - 1. Review and discuss waste management plan including responsibilities of waste management coordinator.
 - 2. Review requirements for documenting quantities of each type of waste and its disposition.
 - 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
 - 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
 - 5. Review waste management requirements for each trade.

1.8 WASTE MANAGEMENT PLAN/REGULATORY REQUIREMENTS

- A. Construction Waste Management, General: Recycle and/or salvage for reuse a minimum of 65 percent of the non-hazardous construction and demolition waste in accordance with one of the following 2019 California Green Standards Code (GBSC) Sections, or meet a local construction and demolition waste management ordinance, whichever is more stringent:
 - 1. Construction Waste Management Plan (GBSC Section 5.408.1.1): Where a local jurisdiction does not have a construction and demolition waste management ordinance that is more stringent, provide Waste Management Plan that:
 - a. Identifies the construction and demolition waste materials to be diverted from disposal by efficient usage, recycling, reuse on the project or salvage for future use or sale.
 - b. Determines if construction and demolition waste materials will be sorted on-site (source separated) or bulk mixed (single stream).

- c. Identifies diversion facilities where construction and demolition waste material collected will be taken.
 - d. Specifies the amount of construction and demolition waste materials diverted shall be calculated by weight or volume, but not by both.
- 2. Waste Management Company (GBSC Section 5.408.1.2): Utilize a waste management company that can provide verifiable documentation that the percentage of construction and demolition waste material diverted from the landfill complies with CGBSC Section 5.408.1.
 - a. Exception 1: Excavated soil and land-clearing debris.
 - b. Exception 2: Alternate waste reduction methods developed by working with local agencies if diversion or recycle facilities capable of compliance with this item do not exist.
 - c. Demolition waste meeting local ordinance or calculated in consideration of local recycling facilities and markets.
- 3. Waste Stream Reduction Alternative (GBSC Section 5.408.1.3): The combined weight of new construction disposal that does not exceed two pounds per square foot of building area may be deemed to meet the 65 percent minimum requirement as approved by the enforcing agency.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management procedures. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management procedures during the entire duration of the Contract.
 - 1. Comply with operation, termination, and removal requirements in Division 01 Section "Temporary Facilities and Controls."
- B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at Project site full time for duration of Project.
- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
 - 1. Distribute waste management procedures to everyone concerned within three days of submittal return.

2. Distribute waste management procedures to entities when they first begin work on-site. Review procedures and locations established for salvage, recycling, and disposal.
- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
 2. Comply with Division 01 Section "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE

- A. General: Contract Documents identify items to be salvaged for reinstallation and items to be salvaged to the Owner; items indicated to be removed become the Contractor's property, Contractor may salvage removed items and offer for sale and/or donation.
- B. Salvaged Items for Reuse/Reinstallion in the Work: Salvage items for reuse and handle as follows:
1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
 3. Store items in a secure area until installation.
 4. Protect items from damage during transport and storage.
 5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- C. Salvaged Items to Owner: Salvage items for Owner's use and handle as follows:
1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
 3. Store items in a secure area until delivery to Owner.
 4. Transport items to Owner's storage area designated by Owner.
 5. Protect items from damage during transport and storage.
- D. Salvaged Items for Sale and/or Donation: Not permitted on Project site.
- E. Salvaged Items for Reinstallation or Owner's Use:
1. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.
 2. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.
 3. Plumbing Fixtures: Separate by type and size.
 4. Lighting Fixtures: Separate lamps by type and protect from breakage.

5. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

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

3.4 RECYCLING DEMOLITION WASTE

- A. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
- B. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.
- C. Metals: Separate metals by type.

1. Structural Steel: Stack members according to size, type of member, and length.
 2. Remove and dispose of bolts, nuts, washers, and other rough hardware.
- D. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.
- E. Metal Suspension System: Separate metal members including trim, and other metals from acoustical panels and tile and sort with other metals.
- F. Metal Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.
- G. Metal Conduit: Reduce conduit to straight lengths and store by type and size.

3.5 RECYCLING CONSTRUCTION WASTE

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
3. Wood Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
 - a. Comply with requirements in Division 32 Sections as applicable to planting for use of clean sawdust as organic mulch.

C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.

3.6 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

- C. Disposal: Remove waste materials from Owner's property and legally dispose of them.

END OF SECTION

SECTION 017700
CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Closeout procedures at completion.
 - 2. Final cleaning.
 - 3. Repair of the Work.
- B. Related Requirements:
 - 1. Division 01 Section "Operation and Maintenance Data" for operation and maintenance documentation requirements.
 - 2. Division 01 Section "Project Record Drawings" for preparing and submitting Project Record Drawings.
 - 3. Division 01 Section "Warranties" for submitting final warranty information.
 - 4. Division 01 Section "Demonstration and Training" for requirements for instructing Owner's personnel.
 - 5. Divisions 02 through 33 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.3 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Submit the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 2. Submit closeout documentation specified in other Division 01 Sections, including project record drawings, operation and maintenance data, construction photographic documentation, warranties, and similar final record information.

3. Submit closeout documentation specified in individual Division 02 through 33 Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 4. Submit maintenance materials specified in individual Division 02 through 33 Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Engineer. Label with manufacturer's name and model number where applicable.
 5. Submit test/adjust/balance records.
 6. Submit sustainable design submittals not previously submitted.
 7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 3. Complete startup and testing of systems and equipment.
 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Division 01 Section "Demonstration and Training."
 6. Advise Owner of changeover in utilities.
 7. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 8. Complete final cleaning requirements, including touchup painting.
 9. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection for Completion a minimum of 10 days prior to date the work will be completed and ready for inspection. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will notify Contractor of items, either on Contractor's list or additional items identified by Engineer, that must be completed or corrected.
1. Engineer's Punch List: During inspection, Engineer will prepare a list of items needing completion or correction (punch list), a copy of the punch list will be distributed to the Contractor and Owner.
 2. Reinspection: Request reinspection when the Work identified in previous inspection as incomplete is completed or corrected.
 3. Results of completed inspection will form the basis of requirements for final completion.

- E. Contractor's Cost for Reinspection: Engineer will perform one inspection and one reinspection at no additional cost to the Contractor. The expense for the Engineer's time for additional inspections will be paid by the Owner with the amount being deducted from the Contract Sum. The expense will be based on an hourly rate in accordance with the Engineer's standard hourly rate schedule in effect at the time the work is performed with a minimum of \$400.00 dollars for each additional reinspection.

1.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Engineer (Company name).
 - d. Name of Contractor (Company Name).
 - e. Page number.
 4. Submit list of incomplete items in one of the following formats:
 - a. MS Excel electronic file. Engineer will return annotated file.
 - b. PDF electronic file. Engineer will return annotated file.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
1. Use cleaning products that comply with the California Green Building Standards Code maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for Completion for entire Project or for a designated portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - g. Sweep concrete floors broom clean in unoccupied spaces.
 - h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
 - i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - j. Remove labels that are not permanent.
 - k. Wipe surfaces of mechanical, electrical, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - l. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - m. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - n. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.

- o. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
 - p. Leave Project clean and ready for occupancy.
- C. Construction Waste Disposal: Comply with waste disposal requirements in Division 01 Section "Construction Waste Management and Disposal."

3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
 - 1. Comply with requirements of Division 02 through 33 Sections as applicable to the Work to be restored and/or repaired.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
 - 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
 - 2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.
 - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
 - 3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
 - 4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION

SECTION 017823
OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance documentation, including the following:
 - 1. Operation and maintenance documentation directory manuals.
 - 2. Emergency manuals.
 - 3. Systems and equipment operation manuals.
 - 4. Systems and equipment maintenance manuals.
 - 5. Product maintenance manuals.
- B. Related Sections:
 - 1. Division 01 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
 - 2. Division 01 Section "Demonstration and Training" for demonstration and training materials.
 - 3. Division 01 Section "General Commissioning Requirements" for verification and compilation of data into operation and maintenance manuals.
 - 4. Divisions 02 through 33 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.3 SUBMITTALS

- A. Closeout Submittal: Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as previously reviewed and approved at the time of individual Section submittals; where applicable, clarify and update previously reviewed content to correspond to revisions and field conditions. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Initial Submittal: Submit draft electronic copy of each manual at least 30 days before commencing demonstration and training. Engineer will comment on whether content of operations and maintenance submittal is acceptable.
 - a. Correct or revise each manual to comply with Engineer's comments. Submit final submittal copies of each corrected manual within 15 days of receipt of Engineer's comments and prior to commencing demonstration and training.
 - 2. Final Submittal: Submit in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Submit the following:
 - a. Paper Copy: Submit one paper-copy set of marked-up record prints that have been revised to address Engineer's comments from the initial submittal.
 - b. Digital Data Files: Submit digital data files of Project Record Drawings as PDF files on a thumb-drive.
- B. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.4 FORMAT OF OPERATION AND MAINTENANCE MANUALS

- A. Electronic File Manuals: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
 - 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 - 2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

- B. Paper Copy Manuals: Submit manuals in the form of hard-copy, bound and labeled volumes.
1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf or post-type binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents, and indicate Specification Section number(s) on bottom of spine. Indicate volume number for multiple-volume sets.
 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
 3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment. Enclose title pages and directories in clear plastic sleeves.
 4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
 5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

1.5 REQUIREMENTS FOR OPERATION AND MAINTENANCE MANUALS

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials and in the order listed:
1. Title page.
 2. Table of contents.
 3. Manual contents.
- B. Title Page: Include the following information as applicable:
1. Subject matter included in the manual.
 2. Name and address of Project.

3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for the following:
 - a. Contractor.
 - b. Installer.
 - c. Engineer.
 - d. Commissioning Authority if applicable.
 - e. Engineer's major consultants that designed the systems contained in the manuals.
6. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

1.6 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY MANUAL

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals. List items and their location to facilitate ready access to desired information. Include the following:

1. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
2. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
3. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

1.7 EMERGENCY MANUALS

- A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- B. Content: Organize manual into a separate section for each of the following:
 - 1. Type of emergency.
 - 2. Emergency instructions.
 - 3. Emergency procedures.
- C. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
 - 1. Fire.
 - 2. Flood.
 - 3. Gas leak.
 - 4. Water leak.
 - 5. Power failure.
 - 6. Water outage.
 - 7. System, subsystem, or equipment failure.
 - 8. Chemical release or spill.
- D. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- E. Emergency Procedures: Include the following, as applicable:
 - 1. Instructions on stopping.
 - 2. Shutdown instructions for each type of emergency.
 - 3. Operating instructions for conditions outside normal operating limits.
 - 4. Required sequences for electric or electronic systems.
 - 5. Special operating instructions and procedures.

1.8 SYSTEMS AND EQUIPMENT OPERATION MANUALS

- A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.
 - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

- B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
 2. Performance and design criteria if Contractor is delegated design responsibility.
 3. Operating standards.
 4. Operating procedures.
 5. Operating logs.
 6. Wiring diagrams.
 7. Control diagrams.
 8. Piped system diagrams.
 9. Precautions against improper use.
 10. License requirements including inspection and renewal dates.
- C. Descriptions: Include the following:
1. Product name and model number. Use designations for products indicated on Contract Documents.
 2. Manufacturer's name.
 3. Equipment identification with serial number of each component.
 4. Equipment function.
 5. Operating characteristics.
 6. Limiting conditions.
 7. Performance curves.
 8. Engineering data and tests.
 9. Complete nomenclature and number of replacement parts.
- D. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
 2. Equipment or system break-in procedures.
 3. Routine and normal operating instructions.
 4. Regulation and control procedures.
 5. Instructions on stopping.
 6. Normal shutdown instructions.
 7. Seasonal and weekend operating instructions.
 8. Required sequences for electric or electronic systems.
 9. Special operating instructions and procedures.
- E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- F. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

1.9 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of

a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.
- C. Source Information: List each system, subsystem, and piece of equipment included in manual, identify by product name and arrange to match table of contents. For each piece of equipment, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- D. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
 - a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 3. Identification and nomenclature of parts and components.
 4. List of items recommended to be stocked as spare parts.
- E. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
1. Test and inspection instructions.
 2. Troubleshooting guide.
 3. Precautions against improper maintenance.
 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.

5. Aligning, adjusting, and checking instructions.
 6. Demonstration and training video recording, if available.
- F. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- I. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.
- J. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
1. Do not use original project record documents as part of maintenance manuals.

1.10 PRODUCT MAINTENANCE MANUALS

- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- C. Source Information: List each product included in data identified by product name and arranged to match table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- D. Product Information: Include the following, as applicable:
1. Product name and model number.
 2. Manufacturer's name.

3. Color, pattern, and texture.
 4. Material and chemical composition.
 5. Reordering information for specially manufactured products.
- E. Maintenance Procedures: Include manufacturer's written recommendations and the following:
1. Inspection procedures.
 2. Types of cleaning agents to be used and methods of cleaning.
 3. List of cleaning agents and methods of cleaning detrimental to product.
 4. Schedule for routine cleaning and maintenance.
 5. Repair instructions.
- F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 017836
WARRANTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for warranties required by the Contract Documents, including manufacturers' standard warranties on products and special warranties.
- B. Related Sections include but are not limited to the following:
 - 1. Division 01 Section "Closeout Procedures."
 - 2. Division 01 Section "Operation and Maintenance Data."
 - 3. Division 02 through 33 Sections for specific warranty requirements.

1.3 DEFINITIONS

- A. Standard product warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
- B. Special project 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.

1.4 WARRANTY REQUIREMENTS

- A. 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. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.
- B. Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.

- C. 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.
- D. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the 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.
- E. Owner's Recourse: Expressed 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. Expressed warranty periods shall not be interpreted as limitations on the 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 selection to products with warranties not in conflict with requirements of the Contract Documents.
- F. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, the Owner reserves the right to refuse to accept the Work, until the Contractor presents evidence that entities required to countersign such commitments are willing to do so.

1.5 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Engineer for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
- C. Warranties: Submit (2) copies of each required warranty properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
 - 1. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
 - 2. Include copy of each warranty in operation and maintenance documentation.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 017839
PROJECT RECORD DRAWINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for Project Record Drawings:
- B. Related Sections:
 - 1. Division 01 Section "Use of Engineer's Electronic Files" for requirements related to use of Engineer's digital data files.
 - 2. Division 01 Section "Execution" for surveys of exterior accessible routes.
 - 3. Division 01 Section "Closeout Procedures" for general closeout procedures.
 - 4. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.3 RECORD DRAWING SUBMITTAL

- A. Closeout Submittal: Submit Record Drawings as follows:
 - 1. Initial Submittal: Submit one paper-copy set of marked-up record prints.
 - a. Engineer will indicate whether record prints are acceptable or if additional information or documentation is needed, and will return the set to the Contractor.
 - 2. Final Submittal:
 - a. Paper Copy: Submit one paper-copy set of marked-up record prints that have been revised to address Engineer's comments from the initial submittal.
 - b. Digital Data Files: Submit digital data files of Project Record Drawings as PDF files on a thumb-drive.

1.4 PROJECT RECORD DRAWINGS

- A. Record Drawings: Maintain one set of paper copies of the Contract Drawings during the construction period for Project Record Drawing Purposes.
1. Project Record Drawing print sets shall include all drawings of the Contract Documents including original project Drawings, Shop Drawings, Supplemental Drawings, Coordination Drawings, Clarification Drawings, Change Orders, and similar drawings. Record Drawing set shall include all drawings of Contract Documents whether or not changes and additional information were recorded.
 2. Store Project Record Drawings in the field office apart from the Contract Documents used for construction; do not use Project Record Drawings for construction purposes.
 3. Maintain Record Drawings in good order and in a clean, dry, legible condition, protected from deterioration and loss.
 4. Provide access to Project Record Drawings for Engineer's reference during normal working hours.
 5. Incorporate new and revised drawings into Project Record Drawings as modifications are issued; do not wait until the end of Project.
 6. Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an understandable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - e. Cross-reference record prints to corresponding archive photographic documentation.
 7. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Depths of foundations below first floor.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Duct size and routing.
 - i. Locations of concealed internal utilities.
 - j. Changes made by Change Order or Construction Change Directive.
 - k. Changes made following Engineer's written orders.
 - l. Details not on the original Contract Drawings.
 - m. Field records for variable and concealed conditions.
 - n. Record information on the Work that is shown only schematically.

8. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
 9. Mark record prints with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 10. Mark important additional information that was either shown schematically or omitted from original Drawings.
 11. Note Construction Change Directive numbers, Change Order numbers, and similar identification, where applicable.
- B. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing Record Drawings where Engineer determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
 2. Consult Engineer for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared Record Drawings into Record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.
- C. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, submit marked-up record prints to Engineer, following Engineer's review and action, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
1. Format: PDF electronic file.
 2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
 3. Refer instances of uncertainty to Engineer for resolution.
 4. Engineer will furnish Contractor one set of digital data files of the Contract Drawings in PDF format for use in recording information.
 - a. Refer to Division 01 Section 011105 "Use of Engineer's Electronic Files" for requirements related to use of Engineer's digital data files.
- D. Format:
1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 2. Record Digital Data Files:
 - a. Format: Annotated PDF electronic file.
 - b. Organize digital data information into separate electronic files corresponding with each building design discipline of the Contract Documents; name each file with the corresponding design discipline.

E. Identification: Include the following information on each Record Drawing:

1. "PROJECT RECORD DRAWING" designation located in a prominent location.
2. Project name if Project name is not included in a title block as part of the drawing.
3. Date.
4. Name of Engineer if Engineer's name is not included in a title block as part of the drawing.
5. Name of Contractor.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 017900
DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel in demonstration and training of operation and maintenance of systems, subsystems, and equipment.
- B. Related Sections:
 - 1. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manuals and data.
 - 2. Divisions 02 through 33 Sections for specific requirements for demonstration and training for products in those Sections.

1.3 SUBMITTALS

- A. Training materials in addition to Operation and Maintenance manuals required in Division 01 Section "Operation and Maintenance Data."
- B. Instruction Program Schedule: Submit outline schedule of instructional program that includes and coordinates programs for all products, equipment, and systems requiring demonstration and training. Schedule shall include a list of training sessions, proposed dates, times, length of instruction time.
 - 1. Schedule shall be coordinated and finalized with the Owner.

1.4 QUALITY ASSURANCE

- A. Instructor Qualifications: A factory-authorized service representative experienced in operation and maintenance procedures and training of Owner's personnel.

1.5 COORDINATION

- A. Coordinate instruction schedule with Owner, adjust schedule as required to minimize disrupting Owner's operations.

- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training sessions with content of approved operation and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Engineer.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

- A. Provide instruction programs that include training sessions for each system and for equipment not part of a system, as required by individual Specification Sections. Include instruction for the following as applicable to the system, equipment, or component:
 - 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - a. System, subsystem, and equipment descriptions.
 - b. Operating standards.
 - c. Regulatory requirements.
 - d. Equipment function.
 - e. Operating characteristics.
 - f. Limiting conditions.
 - g. Performance curves.
 - 2. Documentation: Review the following items in detail:
 - a. Emergency manuals.
 - b. Operations manuals.
 - c. Maintenance manuals.
 - d. Project record documents.
 - e. Identification systems.
 - f. Warranties and bonds.
 - g. Maintenance service agreements and similar continuing commitments.
 - 3. Emergencies: Include the following, as applicable:
 - a. Instructions on meaning of warnings, trouble indications, and error messages.
 - b. Instructions on stopping.
 - c. Shutdown instructions for each type of emergency.
 - d. Operating instructions for conditions outside of normal operating limits.
 - e. Sequences for electric or electronic systems.
 - f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:
 - a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.
 - j. Operating procedures for system, subsystem, or equipment failure.
 - k. Seasonal and weekend operating instructions.
 - l. Required sequences for electric or electronic systems.
 - m. Special operating instructions and procedures.
5. Adjustments: Include the following:
 - a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.
6. Troubleshooting: Include the following:
 - a. Diagnostic instructions.
 - b. Test and inspection procedures.
7. Maintenance: Include the following:
 - a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Procedures for routine cleaning
 - e. Procedures for preventive maintenance.
 - f. Procedures for routine maintenance.
 - g. Instruction on use of special tools.
8. Repairs: Include the following:
 - a. Diagnosis instructions.
 - b. Repair instructions.
 - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - d. Instructions for identifying parts and components.
 - e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Assemble educational materials necessary for instruction and training. Assemble training manuals organized in coordination with requirements in Division 01 Section "Operations and Maintenance Data."
- B. Coordinate with Owner for number of instruction times, location, and number of participants.
- C. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

- A. Instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 - 1. Owner will furnish Contractor with names and positions of participants.
- B. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 - 1. Schedule initial training with Owner, through Engineer with at least 7 days' advance notice.
- C. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

END OF SECTION

SECTION 024119
SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Demolition and removal of selected portions of building or structure.
- B. Related Sections include the following:
 - 1. Division 01 Section "TEMPORARY FACILITIES AND CONTROLS" for temporary construction and environmental-protection measures for selective demolition operations.
 - 2. Division 01 Section "PHOTOGRAPHIC DOCUMENTATION" for photographic documentation of pre-demolition conditions.
 - 3. Division 01 Section "EXECUTION" for cutting and patching procedures.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be salvaged or reinstalled.
- B. Existing to Remain: Existing items or improvements that are to remain and not be removed. Existing items to remain shall be protected from damage during the course of construction.

1.4 MATERIALS OWNERSHIP

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

1.5 SUBMITTALS

- A. Predemolition Photographs: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Comply with Division 01 Section "Photographic Documentation." Submit before Work begins.

1.6 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.
- B. Predemolition Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to selective demolition.

1.7 FIELD CONDITIONS

- A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- B. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is expected that hazardous materials will not be encountered in the Work.
 - 1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Owner will remove hazardous materials under a separate contract.
- E. Utility Services: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.
- F. Storage or sale of removed items or materials on-site is not permitted.

1.8 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties. Notify warrantor before proceeding.

- B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

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

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
 - 1. If unanticipated mechanical, electrical, or structural elements are encountered and found to be in conflict with intended function or design, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.
- C. Inventory and record the condition of items to be removed and salvaged or removed and reinstalled. Provide photographs of conditions that might be misconstrued as damage caused by salvage operations.

3.2 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Comply with requirements for access and protection specified in Division 01 Section "TEMPORARY FACILITIES AND CONTROLS."
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
2. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.

3.3 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 01 Section "TEMPORARY FACILITIES AND CONTROLS."
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
 1. Strengthen or add new supports when required during progress of selective demolition.
- C. Remove temporary barricades and protections where hazards no longer exist.

3.4 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

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

3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
 - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
 - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
 - g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.5 SELECTIVE DEMOLITION, GENERAL

- A. General: Remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 4. Do not use plasma or flame cutting torches without written approval from Architect. Where allowed, clear area of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations. Maintain fire watch during and for at least two hours after flame-cutting operations. Maintain adequate ventilation when using cutting torches.
 5. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 6. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 7. Dispose of demolished items and materials promptly, comply with requirements of Division 01 Section "CONSTRUCTION WASTE MANAGEMENT."

- B. Minor Accessories and Fixtures: Remove minor accessories and fixtures as required to accommodate removal of existing finishes or application new finishes whether items are indicated to be removed or not.
 - 1. Minor accessories and fixtures shall include but not be limited to toilet room accessories; classroom accessories such as pencil sharpeners coat hooks, flag holders, and similar items.
 - 2. Where new replacement items are not indicated or specified in other sections, minor accessories and fixtures shall be considered to be items to be removed and reinstalled.
- C. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and reinstalled in their original locations after selective demolition operations are complete.
 - 1. Items removed, salvaged, and reinstalled for the Contractor's convenience shall be considered the same as items to be removed and salvaged for reinstallation.

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Suspended Acoustic Panel Ceilings:
 - 1. Ceiling Panels: Ceiling panels may be removed and reinstalled, or replaced, as necessary to accomplish Work above suspended acoustic panel ceilings as required by the Project conditions.
 - 2. Suspended Ceiling Grid: Suspended ceiling grid systems and grid members shall not be cut or altered in any way unless indicated on drawings.
 - a. Unauthorized alteration of suspended ceiling grid systems or members will result in the Contractor upgrading the suspension system to 2022 code requirements at no additional cost to the Owner.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. Recycle or dispose demolition waste materials. Remove demolition waste materials from Project site and legally dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in accordance with local regulations and in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn demolished materials.

3.8 CLEANING

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

END OF SECTION

SECTION 030130
CONCRETE REPAIR AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes repair and patching of concrete surfaces.
- B. Related Sections:
 - 1. Division 03 Section "Cast-In-Place Concrete" for general building applications of concrete.

1.3 ACTION SUBMITTALS

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

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

- A. Cementitious Material: Portland cement, ASTM C 150, Type I.
- B. Normal-Weight Aggregates: ASTM C 33, Class 3M coarse aggregate or better, graded. Provide aggregates from a single source.
 - 1. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: ASTM C 94/C 94M and potable.

2.2 REPAIR MATERIALS

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

2.3 ACCESSORY MATERIALS

- A. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- B. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

PART 3 - EXECUTION

3.1 CONCRETE SURFACE REPAIRS

- A. General: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

- C. Repairing Formed Surfaces: Cut out voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried.
 - 1. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
- D. Repairing Unformed Surfaces: Repair unformed surfaces, such as floors and slabs, as follows:
 - 1. Concealed Surfaces: Repair low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
 - 2. Exposed Surfaces: Repair low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Finish to blend with adjacent finished concrete.
 - a. Saw cut perimeter of areas to be repaired to provide straight, clean edges. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface.
- E. Repair materials and installation not specified above may be used, subject to Architect's approval.

END OF SECTION

SECTION 031512
POST INSTALLED CONCRETE ANCHORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes the following types of post installed anchors:

- 1. Expansion anchors.
- 2. Sleeve anchors.
- 3. Drop-in anchors.
- 4. Adhesive anchors.

- B. Related Sections:

- 1. Division 03 Section "Cast-in-Place Concrete."
- 2. Division 05 Section "Metal Fabrications."

1.3 REFERENCES

- A. ACI:

- 1. ACI 318 – Building Code Requirements for Structural Concrete
- 2. ACI 355.2 – Standard for Evaluating the Performance of Post-Installed Mechanical Anchors in Concrete

- B. ASTM:

- 1. ASTM A36 – Standard Specification for Carbon Structural Steel
- 2. ASTM A153 – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- 3. ASTM A193 – Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service
- 4. ASTM A307 – Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
- 5. ASTM A615 – Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
- 6. ASTM B633 – Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel
- 7. ASTM B695 – Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel

8. ASTM C881 – Standard Specification Epoxy-Resin-Based Bonding Systems for Concrete
 9. ASTM E488 – Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements
 10. ASTM E1512 – Standard Test Methods for Testing Bond Performance of Bonded Anchors
 11. ASTM F593 – Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
- C. Federal Specifications A-A-1922A, A-A01923A and A-A-55614 for Expansion and Shield-Type Anchors
- D. ICC-ES
1. ICC-ES AC01 – Acceptance Criteria for Expansion Anchors in Masonry Elements
 2. ICC-ES AC58 – Acceptance Criteria for Adhesive Anchors in Masonry Elements
 3. ICC-ES AC70 – Acceptance Criteria for Fasteners Power-Driven into Concrete, Steel and Masonry Elements
 4. ICC-ES AC193 – Acceptance Criteria for Mechanical Anchors in Concrete Elements
 5. ICC-ES AC308 – Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated; include manufacturer's written installation instructions, physical characteristics, and load tables.
- B. Evaluation Reports: From ICC-ES or IAPMO ES for each type of post installed anchor indicated.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer who has completed post-installed anchor installations similar in material, design, and extent to that indicated for Project that have resulted in construction with a record of not less than 3 years of successful in-service performance.
- B. Evaluation Service Approval: Use only products that have current ICC or IAPMO Evaluation Service approval.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to job site in manufacturer's or distributor's packaging undamaged, complete with installation instructions.
- B. Protect and handle materials in accordance with manufacturer's recommendations to prevent damage or deterioration.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Carbon and Alloy Steel Nuts: ASTM A563.
- B. Carbon Steel Washers: ASTM F436.
- C. Carbon Steel Threaded Rod: ASTM F 1554; or ASTM A193 Grade B7; or ISO 898 Class 5.8.
- D. Wedge Anchors: ASTM A510; or ASTM A108.
- E. Stainless Steel Bolts, Hex Cap Screws, and Studs: ASTM F593.
- F. Stainless Steel Nuts: ASTM F594.
- G. Zinc Plating: ASTM B633.
- H. Hot-Dip Galvanizing: ASTM A153.

2.2 POST INSTALLED ANCHORS

- A. Basis of Design: Post installed anchors shall be of manufacturer, type, and size as indicated on Drawings; manufacturers indicated on the Drawings are selected from the following:
 - 1. Hilti Corporation.
 - 2. Simpson Strong-Tie Company.
- B. Postinstalled Anchors, General:
 - 1. Load Capacity: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in solid grouted unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
 - 2. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5 unless otherwise indicated.
 - 3. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) stainless-steel bolts (Type 304), ASTM F 593, and nuts, ASTM F 594.
- C. Expansion Anchors: Wedge type, torque-controlled, with impact section to prevent thread damage complete with required nuts and washers. Provide anchors with length identification markings conforming to ICC ES AC01 or ICC ES AC193. Type and size as indicated on Drawings.
 - 1. Anchorage to Grouted Masonry, provide one of the following:
 - a. Hilti Kwik Bolt 3, ICC ESR-1385.

- b. Simpson Strong-Tie, Strong-Bolt 2 wedge anchor, IAPMO ER-0240.
- 2. Anchorage to Concrete, provide one of the following:
 - a. Hilti Kwik Bolt TZ, ICC ESR-1917 (carbon steel and AISI Type 304 Stainless Steel).
 - b. Simpson Strong-Tie, Strong-Bolt 2 wedge anchor, ICC ESR-3037.
- D. Sleeve Anchors: Torque-controlled, with impact section to prevent thread damage complete with required nuts and washers. Provide anchors with length identification markings conforming to ICC ES AC01 or ICC ES AC193. Type and size as indicated on Drawings.
 - 1. Subject to compliance with requirements, provide anchor indicated on Drawings or one of the following:
 - a. Hilti; HAD-P Undercut Anchor, ICC ESR-1546.
 - b. Submit Request for Substitution.
- E. Drop-in Anchors: Flush, internally threaded shell anchor, bottom bearing type with a slotted single piece steel shell and a tapered expander plug providing 360 degree contact with the base material. Type and size as indicated on Drawings.
 - 1. Subject to compliance with requirements, provide anchor indicated on Drawings or one of the following:
 - a. Hilti; HDI Drop-in Anchor COLA (City of LA) RR 23709.
 - b. Simpson Strong-Tie
 - c. Submit Request for Substitution.
- F. Adhesive Anchors: Two component, all weather, high performance epoxy complying with descriptive requirements of ASTM C 881, Type IV, Grade 3, Classes A, B, and C, except for gel time; mixed and dispensed through motionless, static mixing nozzle and dispensing tool. Threaded steel rod, inserts or reinforcing dowels, complete with nuts, washers, adhesive injection system, and manufacturer's installation instructions. Type and size as indicated on Drawings.
 - 1. Anchorage to Grouted Masonry, provide one of the following:
 - a. Hilti: Threaded rods or steel reinforcing bars with HIT HY-70 Adhesive Anchorage System, ICC ESR-2682.
 - b. Simpson Strong-Tie: Threaded rods or steel reinforcing bars with SET-XP Adhesive Anchorage System, IAPMO ES-0265.
 - 2. Anchorage to Concrete, provide one of the following:
 - a. Hilti: Threaded rods or steel reinforcing bars with HIT RE 500 V3 Adhesive Anchoring System, ICC ESR-3814.
 - b. Simpson Strong-Tie: Threaded rods or steel reinforcing bars with SET-XP Adhesive Anchorage System, ICC ESR-2508.

- G. Capsule Anchors: Threaded steel rod, inserts and reinforcing dowels with 45 degree chisel point, complete with nuts, washers, glass or foil capsule anchor system containing polyvinyl or urethane methacrylate-based resin and accelerator, and manufacturer's installation instructions. Type and size as indicated on Drawings.
 - 1. Subject to compliance with requirements, provide anchor indicated on Drawings or one of the following:
 - a. Hilti HVA Adhesive System with HVU capsules, ICC ER-5369.
 - b. Submit Request for Substitution.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install anchors in accordance with manufacturer's written installation instructions and as indicated on Drawings.
- B. Drilling Concrete and Concrete Unit Masonry:
 - 1. Base Material Strength: Do not drill holes in concrete or masonry until concrete, mortar, and/or grout complies with the following for the type of anchor indicated:
 - a. Expansion Anchors: Do not drill base material until base material has cured 28 days minimum.
 - b. Adhesive Anchors: Do not drill base material until base material has cured 7 days minimum.
 - 2. Drill holes with rotary impact hammer drills using carbide-tipped bits and core drills using diamond core bits. Drill bits shall be of diameters as specified by the anchor manufacturer. Unless otherwise shown on the Drawings, all holes shall be drilled perpendicular to the concrete or masonry surface.
 - a. Cored Holes: Where anchors are to be installed in cored holes, use core bits with matched tolerances as specified by the manufacturer.
 - b. Embedded Items: Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Exercise care in coring or drilling to avoid damaging existing reinforcing or embedded items. Notify the Engineer if reinforcing steel or other embedded items are encountered during drilling. Take precautions as necessary to avoid damaging

prestressing tendons, electrical and telecommunications conduit, and gas lines.

- C. Wedge Anchors, Sleeve Anchors, and Undercut Anchors: Protect threads from damage during anchor installation. Sleeve anchors shall be installed with sleeve fully engaged in part to be fastened. Set anchors to manufacturer's recommended torque, using a torque wrench. Following attainment of 10% of the specified torque, 100% of the specified torque shall be reached within 7 or fewer complete turns of the nut. If the specified torque is not achieved within the required number of turns, the anchor shall be removed and replaced unless otherwise directed by the Architect.
- D. Cartridge Injection Adhesive Anchors: Clean all holes per manufacturer instructions to remove loose material and drilling dust prior to installation of adhesive. Inject adhesive into 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. Follow manufacturer recommendations to ensure proper mixing of adhesive components. Sufficient adhesive shall be injected in the hole to ensure that the annular gap is filled to the surface. Remove excess adhesive from the surface. Shim anchors with suitable device to center the anchor in the hole. Do not disturb or load anchors before manufacturer specified cure time has elapsed.
- E. Capsule Anchors: Perform drilling and setting operations in accordance with manufacturer instructions. Clean all holes to remove loose material and drilling dust prior to installation of adhesive. Remove water from drilled holes in such a manner as to achieve a surface dry condition. Capsule anchors shall be installed with equipment conforming to manufacturer recommendations. Do not disturb or load anchors before manufacturer specified cure time has elapsed.
- F. Observe manufacturer recommendations with respect to installation temperatures for cartridge injection adhesive anchors and capsule anchors.

3.3 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- B. Base Material Strength: Do not test anchors until base material has cured for a minimum of 28 days and has achieved design strength.
- C. Testing: Each type and size of drilled-in anchor shall be proof loaded by the independent testing laboratory. Adhesive anchors and capsule anchors shall not be torque tested unless otherwise directed by the Structural Engineer. If any anchor fails testing, all anchors of the same type, diameter, and which were installed by the same trade and not previously tested, shall be tested until twenty (20) consecutive anchors pass, then resume the initial test frequency.
 - 1. Minimum anchor embedments, proof loads and torques shall be as indicated on the Drawings.

2. Torque shall be applied with a calibrated torque wrench.
3. Proof loads shall be applied with a calibrated hydraulic ram. Displacement of adhesive and capsule anchors at proof load shall not exceed $D/10$, where D is the nominal anchor diameter.
4. Testing frequency shall be per 2019 CBC 1910A.5.3.
 - a. Sill Plate Bolting: Test 10 percent of anchors.
 - b. Structural Applications other than Sill Plate Bolting: Test all anchors.
 - c. Non-Structural Applications (Equipment Anchorage): Test 50 percent or alternate bolts in a group, including at least one-half the anchors in each group, shall be tested.
5. Test acceptance criteria shall be per 2019 CBC 1910A.5.5.

END OF SECTION

SECTION 033000
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
 - 1. Footings.
 - 2. Slabs-on-grade.
- B. Related Sections:
 - 1. Division 01 Section "Quality and Testing Requirements" for administrative and procedural requirements for quality assurance including independent testing requirements.
 - 2. Division 22 and 23 Sections as applicable to Plumbing and Mechanical items embedded in concrete.
 - 3. Division 26 Sections as applicable to Electrical items embedded in concrete.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.
- B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup

spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

1. Shop drawings shall be in accordance with ACI SP-66 or CRSI "Manual of Standard Practice."
 2. Mill certificates: Steel producer's certificates of mill analysis, tensile, and bend tests for reinforcing steel. Submit certificates accompanying the Shop Drawings.
- D. Construction Joint Layout Shop Drawings: Show locations of proposed construction and control joints other than, or in addition to, those as indicated on the drawings. Location of joints is subject to approval of the Architect.
- E. Qualification Data: For the Ready-mixed concrete manufacturer, include copies of applicable ACI certificates.
- F. Material Certificates: For each of the following, signed by manufacturers:
1. Cementitious materials.
 2. Admixtures.
 3. Form materials and form-release agents.
 4. Steel reinforcement and accessories.
 5. Fiber reinforcement.
 6. Waterstops.
 7. Curing compounds.
 8. Floor and slab treatments.
 9. Bonding agents.
 10. Adhesives.
 11. Semirigid joint filler.
 12. Joint-filler strips.
 13. Repair materials.
- G. Material Test Reports: For aggregates, from a qualified testing agency, indicating compliance with requirements:
- H. Mill certificates: Steel producer's certificates of mill analysis, tensile, and bend tests for reinforcing steel. Submit certificates accompanying the Shop Drawings.
- I. Steel Reinforcement Record Drawings: Shop drawings shall be corrected to reflect actual field changes and shall be submitted to the Architect.
- J. Welding certificates.
- K. Delivery Tags: Delivery tags for all concrete.
- L. Batch Plant Inspection Waiver: When batch plant inspection waiver is requested, evidence of compliance shall be submitted to, and approved by, the Governing Agency; refer to requirements in Part 3 Article "Field Quality Control."

1.5 QUALITY ASSURANCE

- A. **Installer Qualifications:** A qualified installer who employs on Project personnel who shall be thoroughly familiar with the specified requirements, completely trained and experienced in the necessary skills required for work performed under this Section. In actual installation of the work of this Section, use adequate numbers of skilled workmen to insure installation in strict accordance with the contract documents design.
- B. **Concrete Manufacturer Qualifications:** A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 - 1. Manufacturer shall be certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- C. **Testing Agency:** An independent agency retained by the Owner, acceptable to the Architect, and qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
- D. **Source Limitations:** Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- E. **Welding Qualifications:** Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel."
- F. **ACI Publications:** Comply with the following unless modified by requirements in the Contract Documents:
 - 1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.
 - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- G. **Preinstallation Conference:** Conduct conference at Project site.
 - 1. Review the following:
 - a. Special inspection and testing and inspecting agency procedures for field quality control.
 - b. Construction joints, control joints, isolation joints, joint-filler strips, and semirigid joint fillers.
 - c. Vapor-retarder installation.
 - d. Steel reinforcement installation.
 - e. Anchor rod and anchorage device installation tolerances.
 - f. Cold and hot weather concreting procedures.
 - g. Concrete finishes and finishing.
 - h. Curing procedures.
 - i. Forms and form-removal limitations.
 - j. Shoring and reshoring procedures.
 - k. Methods for achieving specified floor and slab flatness and levelness.
 - l. Floor and slab flatness and levelness measurements.
 - m. Concrete repair procedures.

- n. Concrete protection.
- o. Initial curing and field curing of field test cylinders (ASTM C31/C31M.)
- p. Protection of field cured field test cylinders.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
 - 1. Identification: Bundle and tag reinforcing steel with grades and suitable identification marks for checking, sorting and placing. Use waterproof tags and markings and do not remove until steel is in place.

1.7 COORDINATION

- A. Slab Finishes: Coordinate slab finish requirements with trades installing or applying floor finishes or treatments over slabs. Finishes shall include but not be limited to concrete sealing, topical concrete vapor control barrier, ceramic tile, resinous/fluid applied floor systems, adhered resilient floor systems, and adhered carpet.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

- A. Earth Forms: Use for sides of footings only where soil is firm and stable and concrete will not be exposed. Where earth forms are used, cut excavations neat and accurate to size for placing concrete directly against the excavation.
- B. Rough-Formed Finished Concrete: Use for formed concrete that will not be exposed in the finished work, fabricate forms of plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Smooth-Formed Finished Concrete: Use for formed concrete that will be exposed in the finished work, fabricate forms of form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
 - 1. Plywood, metal, or other approved panel materials.
- D. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- E. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
 - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- B. Plain-Steel Wire: ASTM A 82/A 82M, as drawn.
- C. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain, fabricated from as-drawn steel wire into flat sheets.
- D. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.
- E. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - 1. Slabs on Grade and Foundations: Use precast concrete blocks, plastic-coated steel with bearing plates or specifically designed wire-fabric supports fabricated of plastic. Precast blocks shall be not less than 3 inches by 3 inches square and shall have a compressive strength equal to or greater than the strength of the surrounding concrete.
 - 2. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
- F. Fabricating Reinforcement: Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice" or ACI SP-66 and the details shown on the Drawings.
 - 1. In the case of fabricating errors, do not rebend or straighten reinforcement in a manner that will damage or weaken the material.
 - 2. Bends shall be made cold using pin sizes as recommended ACI 318 as modified by T24, CCR, Part 2.
 - 3. Unacceptable Work: Reinforcement with any of the following defects will not be permitted:
 - a. Bar lengths, depths, and bends exceeding specified fabrication tolerance.
 - b. Bends or kinks not indicated on the project Drawings or the final Shop Drawings.
 - c. Bars with reduced cross-section due to excessive rusting or other cause.

2.3 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
 - 1. Portland Cement: ASTM C 150, Type II, gray.

- a. Fly Ash: ASTM C 618, Class F. The use of a quality fly ash will be permitted as a cement-reducing admixture up to a maximum of 15% of the weight of portland-cement.
- B. Normal-Weight Aggregates: ASTM C 33, Class 3M coarse aggregate or better, graded. Provide aggregates from a single source.
1. Where concrete expansion from alkali silica or alkali carbonate reactions is anticipated, provide aggregate with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.
 2. Fine and coarse aggregates shall be regarded as separate ingredients. Each size of coarse aggregate, as well as the combination of sizes when two or more are used, shall conform to the grading requirements of ASTM C33.
 3. Coarse aggregate: Coarse aggregate shall consist of a clean, hard, fine grained, sound crushed rock, or washed gravel or a combination of both. It shall be free from oil, organic matter, or other deleterious substances. Aggregate shall be uniformly graded from one-quarter inch size to maximum size.
 4. The maximum size of aggregates used in the project shall be consistent with the dimensions and form of the section being placed, the location and spacing of the reinforcing bars, and with the method of compaction, and shall be such as will produce dense and uniform concrete free from rock pockets, honey-comb and other irregularities. The nominal maximum size of the aggregate shall not be more than one-fifth the narrowest dimension between forms, one-third the depth of slabs nor three-fourths the minimum clear spacing between reinforcing bars.
 5. Combined Grading: The combined grading shall be such that the percentage by weight of the combined aggregates shall fall within the limits established as follows:

Sieve number or size in inches (maximum)	Percentage by Weight		
	1-1/2"	1"	3/4"
Passing a 2 inch	---	---	---
Passing a 1-1/2 inch	95-100	---	---
Passing a 1 inch	70-90	90-100	---
Passing a 3/4 inch	50-80	70-95	90-100
Passing a 3/8 inch	40-60	45-70	55-75
Passing a No. 4	35-55	35-55	40-60
Passing a No. 8	25-40	27-45	30-46
Passing a No. 16	16-34	20-38	23-40
Passing a No. 30	12-25	12-27	13-28
Passing a No. 50	2-12	5-15	5-15
Passing a No. 100	0-3	0-5	0-5

6. Special grading or size limitations: When reviewed and approved by the Architect, other gradings or maximum size limitations may be used if mixes are designed and tested in accordance with the concrete mixture specified in the "Concrete Mixtures" Article.

7. Soundness of Aggregates: Both the coarse and fine aggregate shall be tested by the use of a solution of sodium or magnesium sulfate, or both, whenever in the judgment of the Architect, such tests are necessary to determine the quality of the material. Such tests shall be performed in accordance with ASTM C88 and the results shall show compliance with the limits set forth in ASTM C33.
8. Reactivity: Aggregates shall be free from any substance which may be deleteriously reactive with the alkalis in the cement in an amount sufficient to cause excessive expansion of the concrete or which will interfere with normal hydration of the cement. Acceptability of the aggregate shall be based upon satisfactory evidence that the aggregate is free from such materials.
9. Aggregates shall be tested, when required by the Architect prior to the concrete mix being established, in accordance with the following specifications:

Test	Specification
Abrasion	ASTM C131 and C535
Gradation	ASTM C136
Alkali Reactivity	ASTM C289 and C227
Organic Impurities	ASTM C40
Clay Lumps	ASTM C142

10. Maximum Coarse-Aggregate Size: Nominal size as indicated on Drawings.
11. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: ASTM C 94/C 94M and potable.

2.4 ADMIXTURES

- A. Admixtures shall be reviewed and approved by the Architect and the Division of the State Architect.
- B. Calcium chloride, thiocyanates or admixtures containing more than 0.05% chloride ions are not permitted.
- C. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Certification of requirements and chloride ion content is required from the admixture manufacturer prior to mix design review.

1. Air-entraining Admixture: ASTM C260.
 - a. Available Products: Subject to compliance with requirements, provide one of the following products:
 - 1) Euclid Chemical Company (The); Air Mix.
 - 2) BASF/Master Builders, Inc.; Micro-Air.
 - 3) Sika Corporation; Sika AER.
2. Water-reducing Admixtures: ASTM C494 Type A.

- a. Available Products: Subject to compliance with requirements, provide one of the following products:
 - 1) Euclid Chemical Company (The); Eucon WR-75.
 - 2) BASF/Master Builders Inc.; Pozzolith 220N.
 - 3) Sika Corporation; Plastocrete 161.
3. Water-reducing, Retarding Admixtures: ASTM C494 Type D.
 - a. Available Products: Subject to compliance with requirements, provide one of the following products:
 - 1) Euclid Chemical Company (The); Eucon Retarder-75.
 - 2) BASF/Master Builders Inc.; Pozzolith 300 R.
 - 3) Sika Corporation; Plastiment.
4. High Range Water-Reducing Admixture (HRWR): ASTM C494 type F or G.
 - a. Available Products: Subject to compliance with requirements, provide one of the following products:
 - 1) Euclid Chemical Company (The); Eucon 37.
 - 2) BASF/Master Builders Inc.; Rheobuild 1000.
 - 3) Sika Corporation; Sikament 300.
 - b. When more than 30 minutes is required between the addition of admixtures to final placement of the concrete, a combination of water-reducing, set controlling admixtures (ASTM C494, Types A, D and E) may be used.
5. Non-Corrosive, Non-Chloride Accelerator: ASTM C494 Type C or E.
 - a. Available Products: Subject to compliance with requirements, provide one of the following products:
 - 1) Euclid Chemical Company (The); Accelguard 80.
 - 2) BASF/Master Builders Inc.; Pozzutec 20+.
 - 3) Sika Corporation, Plastocrete 161FL.
 - b. The admixture manufacturer shall have long-term (more than one year duration) non-corrosive test data on metal deck and reinforcing steel from an independent testing laboratory using an acceptable accelerated corrosion test method such as using electrical potential measures.

2.5 CURING AND SEALING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
 1. Products: Subject to compliance with requirements, provide one of the following:

- a. BASF Construction Chemicals - Building Systems; Confilm.
 - b. ChemMasters; SprayFilm.
 - c. Conspec by Dayton Superior; Aquafilm.
 - d. Dayton Superior Corporation; Sure Film (J-74).
 - e. Edoco by Dayton Superior; BurkeFilm.
 - f. Euclid Chemical Company (The), an RPM company; Eucobar.
 - g. Lambert Corporation; LAMBCO Skin.
 - h. L&M Construction Chemicals, Inc.; E-CON.
 - i. Meadows, W. R., Inc.; EVAPRE.
 - j. Sika Corporation; SikaFilm.
 - k. Symons by Dayton Superior; Finishing Aid.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- C. Moisture-Retaining Cover: ASTM C 171, clear or white polyethylene film, 6 mil minimum thickness, or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. BASF Construction Chemicals - Building Systems; Kure 200.
 - b. ChemMasters; Safe-Cure Clear.
 - c. Conspec by Dayton Superior; W.B. Resin Cure.
 - d. Dayton Superior Corporation; Day-Chem Rez Cure (J-11-W).
 - e. Edoco by Dayton Superior; Res X Cure WB.
 - f. Euclid Chemical Company (The), an RPM company; Kurez W VOX; TAMMSCURE WB 30C.
 - g. L&M Construction Chemicals, Inc.; L&M Cure R.
 - h. Meadows, W. R., Inc.; 1100-CLEAR.
 - i. Symons by Dayton Superior; Resi-Chem Clear.
 - 2. Curing compounds are subject to removal after curing period has elapsed; refer to Part 3 Article "Concrete Protecting and Curing."
- F. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. BASF Construction Chemicals - Building Systems; Kure 1315.
 - b. ChemMasters; Polyseal WB.
 - c. Conspec by Dayton Superior; Sealcure 1315 WB.
 - d. Edoco by Dayton Superior; Cureseal 1315 WB.
 - e. Euclid Chemical Company (The), an RPM company; Super Diamond Clear VOX; LusterSeal WB 300.
 - f. Meadows, W. R., Inc.; Vocomp-30.

- g. Symons by Dayton Superior; Cure & Seal 31 Percent E.
- 2. VOC Content: Curing and sealing compounds shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.6 VAPOR RETARDERS

- A. Sheet Vapor Retarder: As specified in Division 07 Section "Underslab Vapor Retarder," ASTM E 1745, Class A, 15 mil thickness minimum.

2.7 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.
- B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 per ASTM D 2240.
- C. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements.

2.8 REPAIR MATERIALS

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

2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

2.9 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301, ACI 318, Chapter 26, and Chapter 19 of the California Building Code.
 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
 - a. The testing agency used for preparing mixture designs shall be different from the testing agency retained by the Owner for testing concrete strength and materials.
- B. Limit water-soluble, chloride-ion content in hardened concrete to the following percentages by weight of cement.
 1. Prestressed concrete: 0.06 percent.
 2. Reinforced concrete exposed to chloride in service: 0.15 percent.
 3. Reinforced concrete that will be dry or protected from moisture in service: 1.00 percent.
 4. Other reinforced concrete: 0.30 percent.
- C. Admixtures: Use admixtures according to manufacturer's written instructions.
 1. Use water-reducing, high-range water-reducing, or plasticizing admixture in concrete, as required, for placement and workability.
 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

2.10 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Proportion normal-weight concrete mixture as indicated on Drawings for strength, slump, water/cement ratio, and maximum aggregate size.

2.11 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
- B. Project-Site Mixing: Project site mixing of structural concrete will not be permitted. Project site mixing of concrete for other purposes may be permitted only when reviewed and approved by the Architect. When allowed, measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M and ACI 318. Mix concrete materials in appropriate drum-type batch machine mixer, the capacity of the mixer shall be such that it will handle one or more full sack batches.
- C. Control of Admixtures:
 1. Admixtures shall be charged into the mixer as solutions and shall be measured by means of an approved mechanical dispensing device. The liquid shall be considered a part of the mixing water. Admixtures that cannot be added in solution may be weighed or may be measured by volume if so recommended by the manufacturer.
 2. If two or more admixtures are used in the concrete, they shall be added separately to avoid possible interaction that might interfere with the efficiency of either admixture or adversely affect the concrete.
 3. Addition of retarding admixtures shall be completed within 1 minute after addition of water to the cement has been completed, or prior to the beginning of the last three-quarters of the required mixing, whichever occurs first.
 4. Admixtures shall be used in accordance with the manufacturer's instructions.
- D. Concrete shall be mixed only in quantities for immediate use. Concrete which has set shall not be retempered, but shall be discarded.
- E. When concrete arrives at the project with slump below that suitable for placing, as indicated by the specifications, water may be added only if neither the maximum permissible water-cement ratio nor the maximum slump is exceeded. The water shall be incorporated by additional mixing equal to at least half of the total mixing required. An addition of water shall be accompanied by a quantity of cement sufficient to maintain the proper water-cement ratio. Such addition shall be reviewed by the Architect.

PART 3 - EXECUTION

3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
 1. Where earth is used for forming sides of footings, increase the width of footings by 1 inch on each side of the footing.

- C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
 - 1. Class A, 1/8 inch for smooth-formed finished surfaces.
 - 2. Class B, 1/4 inch for rough-formed finished surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 - 1. Install keyways, recesses, and the like, for easy removal.
 - 2. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- B. Conduits and Pipes Embedded in Concrete:

1. Pipes, other than conduits for electrical circuits, shall not be embedded in structural concrete unless specifically reviewed and approved by the Architect and the Division of the State Architect. Any pipe or conduit may pass through any walls or floor slab by means of a sleeve so located that it does not impair the strength of the structure. Openings larger than 12 inches in any dimension shall be as detailed on the structural plans.
2. Unless otherwise approved, embedded pipes or conduits, other than those merely passing through, shall be not larger in outside dimension than one-third the thickness of the slab, wall, or beam in which they are embedded, nor shall they be spaced closer than three diameters or widths on center and shall have at least 1-1/2 inches concrete cover.
3. Sleeves, pipes, or conduits of aluminum shall not be embedded in structural concrete unless effectively coated or covered to prevent aluminum-concrete reaction or electrolytic action between aluminum and steel.

3.3 REMOVING AND REUSING FORMS

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

3.4 VAPOR RETARDERS

- A. Vapor retarders shall be installed in accordance with the requirements of Division 07 Section "Underslab Vapor Retarder."

3.5 STEEL REINFORCEMENT

- A. Quality Control: Reinforcement steel and placement shall be subject to inspection and testing per Part 3 Article "Field Quality Control."
- B. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
 1. Coordinate installation of steel reinforcement with installation of vapor barrier specified in Division 07 Section "Underslab Vapor Retarder."
 2. Do not cut or puncture vapor retarder; if cut or damaged, vapor barrier shall be repaired in accordance with Division 07 Section "Below Grade Vapor Retarder."

- C. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- D. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
- E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

3.6 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
 - 2. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
 - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 - a. Use only grooved joints for concrete surfaces that will be permanently exposed to view.
 - 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
 - a. Sawn joints shall not be used for concrete surfaces that will be permanently exposed to view.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
 - 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.

2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Division 07 Section "Joint Sealants," are indicated.
 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.7 CONVEYING

- A. Concrete shall be handled from the mixer to the place of final deposit as rapidly as practicable by methods which will prevent segregation or loss of ingredients and in a manner which will assure that the required quality of the concrete is maintained.
- B. Conveying equipment shall be of a size and design such that detectable setting of concrete shall not occur before adjacent concrete is placed. Conveying equipment shall be cleaned at the end of each operation or work day. Conveying equipment and operations shall conform to the following additional requirements:
1. Truck mixers, agitators and non-agitating units and their manner of operation shall conform to the applicable requirements of ASTM C94.
 2. Belt conveyors shall be horizontal or at a slope which will not cause excessive segregation or loss of ingredients. Concrete shall be protected against undue drying or rise in temperature. A suitable device shall be used at the discharge end to prevent apparent segregation. Mortar shall not be allowed to adhere to the return length of the belt. Long runs shall be discharged into a hopper or through a baffle.
 3. Do not use reinforcement or reinforcement supports to support runways for concrete conveying equipment.
- C. Chutes shall be metal or metal-lined and shall have a slope not exceeding 1 vertical to 2 horizontal and not less than 1 vertical to 3 horizontal. Chutes more than 20 feet long and chutes not meeting the slope requirements may be used provided they discharge into a hopper before distribution.
- D. Pumping or pneumatic conveying equipment shall be of suitable kind with adequate pumping capacity. Pneumatic placement shall be controlled so that segregation is not apparent in the discharged concrete. The loss of slump in pumping or pneumatic conveying equipment shall not exceed 2 inches. Concrete shall not be conveyed through pipe made of aluminum or aluminum alloy. When the concrete is placed into final position by means of pumping, the pumping method for placing concrete shall be reviewed and approved by the Architect and the Division of the State Architect at least one week prior to placing the concrete.

3.8 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
 - 1. Reposition any misaligned reinforcement.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
- C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 - 1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
 - 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 - 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- D. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 2. Maintain reinforcement in position on chairs during concrete placement.
 - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 - 4. Slope surfaces uniformly to drains where required.
 - 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 - 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

F. Hot-Weather Placement: Comply with ACI 305 and as follows:

1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.9 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
1. Apply to concrete surfaces not permanently exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
1. Apply to concrete surfaces permanently exposed to public view, to receive a rubbed finish, or to be covered with a coating or covering material applied directly to concrete.
- C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.10 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 305 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days using a water saturated absorptive cover kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
 - a. This method shall not be used on floor slabs receiving adhered floor systems, fluid applied floor systems, or sealers.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - a. Use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
 - b. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.
 - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.
 - 4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.11 FIELD QUALITY CONTROL

- A. Testing and Inspecting Agency: Owner will engage and pay for a qualified independent testing and inspecting agency to perform tests and inspections as applicable and prepare reports.
 - 1. Testing and Inspection Agency shall be acceptable to the Architect and the Division of the State Architect.

- B. The Architect and the Division of the State Architect shall have the right to order the testing of any materials used in the concrete construction to determine if they are of the quality specified.
- C. Contractor Responsibilities:
1. The Contractor shall maintain control of the quality of materials and workmanship in order to conform with the drawings and specifications.
 2. To facilitate testing and inspection, the Contractor shall:
 - a. Schedule tests and inspections with the Testing and Inspection Agency sufficiently in advance of operations to allow for the assignment of personnel and for the completion of testing and inspecting responsibilities.
 - b. Provide access to the Work for the designated Testing and Inspection Agency.
 - c. Furnish all necessary materials and labor to assist the designated Testing and Inspection Agency in obtaining and handling samples at the project or other sources of materials.
 - d. Provide and maintain for the sole use of the Testing and Inspection Agency adequate facilities for safe storage and proper curing of concrete test specimens on the project site for the first 24 hr. as required by ASTM C31.
 3. The Contractor shall correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.
- D. Testing and Inspection Services:
1. Testing and inspections shall be performed by the designated Testing and Inspection Agency.
 - a. Inspection of steel reinforcement.
 - b. Inspection of headed bolts and studs prior and during concrete placement.
 - c. Verification of use of required design mixture.
 - d. Sampling of concrete for strength tests, slump, air content, and temperature of concrete at time of placement.
 - e. Inspection of concrete placement, including conveying and depositing.
 - f. Inspection of curing procedures and maintenance of curing temperature.
 - g. Verification of concrete strength before removal of shores and forms from beams and slabs.
 - h. Inspection of formwork.
- E. Sampling and Testing of Steel Reinforcement:
1. Samples of reinforcing steel shall be taken by a designated approved testing agency at place of distribution prior to shipment or at project site.
 2. Where samples are taken from bundles as delivered from the mill, with the bundles identified as to heat number and provided the mill analyses accompany the report, one tensile test and one bend test shall be made from a specimen from each 10 tons or fraction thereof of each size of reinforcing steel.

- a. Where positive identification of the heat number cannot be made or where random samples are to be taken, one series of tests shall be made from each 2-1/2 tons or fraction thereof of each size of reinforcing steel.
 3. Each sample shall consist of no fewer than two pieces, each 18 inches long, of each size and grade of reinforcing steel.
- F. Batch Plant Inspection: The quality and quantity of materials used in transit mixed concrete and in batched aggregates shall be continuously inspected at the location where materials are measured by an approved Testing and Inspection Agency.
1. Waiver of Batch Plant Inspection: Batch plant inspection will not be required under the following conditions:
 - a. The concrete plant complies fully with the requirements of ASTM C94, Sections 8 and 9, and has a current certificate from the National Ready Mixed Concrete Association. The certification shall indicate that the plant has automatic batching and recording capabilities.
 - b. The Testing Agency shall check the first batching at the start of work and furnish mix proportions to the licensed weighmaster.
 - c. Licensed weighmaster shall positively identify materials as to quantity and certify to each load by a ticket.
 - d. Tickets shall be transmitted to the Contractor by cement truck driver with load identified thereon. Do not accept loads without a load ticket identifying the mix; Contractor shall keep a daily record of placements identifying each truck, its load and time of receipt, and approximate location of deposit in the structure and will transmit a copy of the daily record to the Architect.
 - e. At the end of the project, the weighmaster shall furnish an affidavit to the Architect certifying that all concrete furnished conforms in every particular to proportions established by mix designs.
 - f. The Testing Agency shall certify and submit evidence of compliance to the governing agency Division of the State Architect and obtain governing agency's approval prior for a waiver of batch plant inspection prior to mixing the concrete.
- G. Placement Record: A record shall be kept on-site of the time and date of placing the concrete in each portion of the structure. Such record shall be kept until the completion of the structure and shall be open to the inspection of the governing agency (Division of the State Architect).
- H. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture but not less than one sample for each 50 cu. yd. or fraction thereof and one sample for each 2,000 square feet of slab area.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31/C 31M.
 - a. Cast and laboratory cure four standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at 7 days for information and two cured specimens at 28 days for strength acceptance, the fourth specimen shall be held in reserve in case additional testing is necessary.
 - a. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
7. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
8. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7 and 28-day tests.
9. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
10. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
11. Additional testing and inspecting will be performed to determine compliance of replaced or additional work with specified requirements.
 - a. The cost of additional testing and inspection of replaced work will be paid for by the Owner with the amount being deducted from the Contract Amount by a Change Order.

END OF SECTION

SECTION 055000
METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Steel framing and supports for applications where framing and supports are not specified in other Sections.
 - 2. Steel framing and supports for mechanical and electrical equipment.

1.3 SUBMITTALS

- A. Product Data: For the following:
 - 1. Fasteners.
 - 2. Shop primers.
 - 3. Shrinkage-resisting grout.
- B. Shop Drawings: For metal fabrications, include plans, elevations, sections, and details of metal fabrications and their connections; show anchorage and accessory items. Show fabrication and installation details for metal fabrications.
- C. Welding certificates.
- D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- E. Research Reports: For post-installed anchors.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.
- B. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1, "Structural Welding Code--Steel."
 - 2. AWS D1.3, "Structural Welding Code--Sheet Steel."

1.5 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of in-place construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate contiguous construction to ensure that actual dimensions correspond to established dimensions.

1.6 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 METAL PRODUCTS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Steel Tubing: ASTM A 500, cold-formed steel tubing.
- D. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.
 - 1. Provide galvanized finish for exterior installations where indicated.
- E. Galvanized Steel Sheet: ASTM A 653/A 653M, G90 coating, structural steel, Grade 33, unless another grade is required by design loads.

2.2 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.
- C. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts,

ASTM F 593; with hex nuts, ASTM F 594; and, where indicated, flat washers; Alloy Group 1.

- D. Anchor Bolts and Unheaded Rods: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.
 - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- E. Post Installed Concrete Anchors: Fabricated from corrosion-resistant materials; manufacturer, size, and type as indicated on Drawings and specified in Division 03 Section "Post Installed Concrete Anchors."

2.3 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Shop Primers: Provide primers that comply with Division 09 Section "Painting."
- C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- E. Shrinkage-Resistant Grout: Factory-packaged, nonmetallic, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.4 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch, unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work true to line and level with accurate angles and surfaces and straight edges.
- E. Weld connections, corners, and seams continuously, unless otherwise indicated, to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
 5. Cope ends of pipe or round tubing at connections to provide close fit.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts, unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and connections that will be exposed to weather in a manner that excludes water. Provide weep holes for drainage where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated on Drawings; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

2.5 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as indicated on the Drawings and as needed to complete the Work.
- B. Fabricate miscellaneous framing and supports from steel shapes, plates, and bars of welded construction to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by miscellaneous framing and supports.
1. Drill, cut, and tap miscellaneous framing and supports to field bolted connections and to receive hardware, hangers, and similar items.
- C. Prime miscellaneous framing and supports used at interior applications.
- D. Galvanize miscellaneous framing and supports used for exterior applications or where indicated.

2.6 STEEL WELD PLATES AND ANGLES

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

2.11 STEEL FINISHES

- A. Finish metal fabrications after assembly.

- B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.
- C. Shop Priming: Shop prime items not to be galvanized unless they are to remain unfinished or are embedded in concrete, or masonry, or unless otherwise indicated; shop prime galvanized items that are to receive field applied top coats.
 - 1. Preparation of Surfaces:
 - a. Cleaning of Galvanized Items for Shop Priming: Where galvanized items are to receive field applied top coats, prepare for priming after galvanizing by thoroughly cleaning galvanized surfaces of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.
 - b. Surface Preparation: Prepare surfaces to comply with the following:
 - 1) Non-Galvanized Items:
 - a) Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - b) Other Steel Items: SSPC-SP 3, "Power Tool Cleaning."
 - 2) Galvanized-Steel Items: SSPC-SP 16, "Brush-off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals."
 - 2. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
 - a. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing and conditions by other Specification Sections where reinforced to receive anchors, to verify that locations of concealed reinforcements are clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag bolts, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.3 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports as indicated on Drawings and to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor support framing securely to, and rigidly brace from, building structure.

3.6 REPAIRS

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

END OF SECTION

SECTION 061000
ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes:

- 1. Framing with dimension lumber.
- 2. Framing with timber.
- 3. Wood blocking and nailers.
- 4. Framing with engineered wood products.
- 5. Rooftop equipment bases and support curbs.

- B. Related Sections:

- 1. Division 03 Section "Post Installed Concrete Anchors" for post installed anchors in concrete and/or masonry.

1.3 DEFINITIONS

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

1.4 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.

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

B. Research/Evaluation Reports: From ICC-ES or IAPMO ES, for the following,:

1. Wood-preservative-treated wood.
2. Engineered wood products.
3. Power-driven fasteners.
4. Powder-actuated fasteners.
5. Post installed concrete anchors.

1.5 REFERENCED CODES AND STANDARDS

A. California Code of Regulations, Title 24, Part 2, California Building Code, 2019 Edition.

B. American Wood Council (AWC):

1. National Design Specification for Wood Construction with commentary, September 30, 2014 (ANSI/AWC NDS-2015).
2. Special Design Provisions for Wind and Seismic with commentary, September 8, 2014 (ANSI/AWC SDPWS-2015).

C. Lumber grading agencies and abbreviations:

1. NLGA: National Lumber Grades Authority.
2. WCLIB: West Coast Lumber Inspection Bureau.
3. WWPA: Western Wood Products Association.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stockpile materials sufficiently in advance of need to assure their availability in a timely manner for Work.
- B. Use extreme care in off-loading of lumber to prevent damage, splitting, and breaking of materials.
- C. Stack wood products flat with spacers beneath and between each bundle to provide air circulation. Protect wood products from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.
- D. Identify framing lumber by grade, and store each grade separately from other grades.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. Provide dressed lumber, S4S, unless otherwise indicated.
- B. Moisture Content of Lumber: 19 percent maximum unless otherwise indicated.
- C. Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.
 - 1. Allowable Design Stresses: Provide engineered wood products with allowable design stresses, as published by manufacturer that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWPA U1, Use Category UC2, for interior construction not in contact with ground.
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat items indicated on Drawings, and the following:
 - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Wood sills, sleepers, blocking, furring, stripping, and similar members in contact with masonry or concrete.
 - 3. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.

4. Wood plates that are installed over concrete slabs-on-grade.

2.3 DIMENSION LUMBER FRAMING

- A. Framing Lumber; Studs, Joists, and Rafters: Douglas Fir, WCLIB or WWP, No. 1 or better, unless otherwise indicated on Drawings.

2.4 TIMBER FRAMING

- A. Timber Framing: Douglas Fir, WCLIB or WWP, No. 1 or better, unless otherwise indicated on Drawings.

2.5 ENGINEERED WOOD PRODUCTS

- A. Engineered Wood Products, General: Engineered Wood Products shall contain no urea formaldehyde.
- B. Source Limitations: Obtain each type of engineered wood product from a single source from a single manufacturer.
- C. Manufacturer and Products: Provide products as indicated on Drawings.
 1. Project structural design based on products indicated on Drawings, changes or substitutions will require a Request for Substitution and a Construction Change Document.

2.6 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber as indicated on Drawings, as required for project conditions, and as required for support or attachment of other construction, including but not limited to blocking, nailers, support curbs, and furring.
- B. Dimension Lumber Items: Provide lumber of species and grade matching framing lumber.
 1. For blocking not used for attachment of other construction, Utility or Stud grade lumber may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
 2. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- C. Boards: Provide lumber of 19 percent maximum moisture content (S-DRY).
 1. Exposed Boards: Where boards will not be concealed by other work or where painted finish is indicated, provide Select Merchantable Boards per WCLIP rules.
 2. Concealed Boards: Where boards will be concealed by other work, provide any species graded construction boards or WCLIP No. 1 or better.

- D. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.7 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
 - 1. Fasteners in contact with preservative treated wood, including nuts and washers, shall be of hot dipped galvanized steel, stainless steel, or silicon bronze; the coating weights for zinc-coated fasteners shall be in accordance with ASTM A 153. Fasteners other than nails, timber rivets, wood screws, and lag screws shall be permitted to be of mechanically deposited zinc-coated steel with coating weights in accordance with ASTM B 695, Class 55 minimum; comply with requirements of 2019 CBC 2304.10.5.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- D. Wood Screws: ASME B18.6.1.
- E. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).
- F. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.
- G. Post Installed Concrete Anchors: Fabricated from corrosion-resistant materials; manufacturer, size, and type as indicated on Drawings and specified in Division 03 Section "Post Installed Concrete Anchors." Materials to comply with the following:
 - 1. Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
 - 2. Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Grade A1 or A4).

2.8 METAL FRAMING ANCHORS AND HARDWARE

- A. General: Connectors in contact with preservative treated or fire retardant treated wood shall be of hot dipped galvanized steel or stainless steel; the coating weights for zinc-coated connectors shall be in accordance with ASTM A 153; comply with requirements of 2019 CBC 2304.10.5.
- B. Basis of Design Manufacturer: Provide products as indicated on Drawings manufactured by the following:
 - 1. Simpson Strong-Tie Co., Inc.

- C. Material: Galvanized steel sheet, hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.
 - 1. Use for interior locations unless otherwise indicated.

2.9 MISCELLANEOUS MATERIALS

- A. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.
- B. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.
 - 1. Use adhesives that have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chlorpyrifos as its active ingredient.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. General: Install framing as indicated on drawings, as herein specified, and as required to comply with regulatory agencies and American Forest and Paper Association (AF&PA) document WCD 1 "Details for Conventional Wood Frame Construction". Notes and details on Drawings shall take precedence over these specifications.
- B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.
- C. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- D. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- E. Install sill sealer gasket to form continuous seal between sill plates and foundation walls.
- F. Do not splice structural members between supports, unless otherwise indicated.
- G. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches on center.
 - H. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities in accordance with 2019 CBC Section 718 "Concealed Spaces" and as follows:
 1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches on center with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
 2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches on center. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal thickness.
 - I. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
 - J. Comply with AWPAC M4 for applying field treatment to cut surfaces of preservative-treated lumber.
 1. Use inorganic boron for items that are continuously protected from liquid water.
 2. Use copper naphthenate for items not continuously protected from liquid water.
 - K. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated on Drawings and complying with the following:
 1. ICC ESR-1539 for power-driven staples and nails.
 2. 2019 CBC Table 2304.10.1 "Fastening Schedule."
 - L. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads, unless otherwise indicated.
 - M. Fasteners and connectors in contact with preservative treated or fire retardant treated wood shall be corrosion resistant as specified under Part 2 product requirements.
- 3.2 WOOD GROUND, SLEEPER, BLOCKING, AND NAILER INSTALLATION
- A. Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
 - B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

- C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.3 WALL AND PARTITION FRAMING INSTALLATION

- A. General: Provide studs, top and bottom plates of sizes indicated on Drawings, 2 inch minimum nominal thickness.
 - 1. Studs: Members of size and spacing indicated on Drawings.
 - 2. Top Plates: Double top plate of width equal that of studs.
 - 3. Bottom Plates: Single bottom plate of width equal that of studs; fasten plates to supporting construction as indicated on Drawings.
 - 4. Mid-Height Blocking: Provide continuous horizontal blocking at mid-height of partitions more than 96 inches high, using members of 2-inch nominal thickness and of same width as studs.
- B. Construct corners and intersections with three or more studs.
- C. Frame openings as indicated on Drawings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Support headers on double-jamb studs for openings 60 inches and less in width, and triple-jamb studs for wider openings. Provide headers of depth indicated.

3.4 RAFTER FRAMING INSTALLATION

- A. Rafter Framing: Install rafter framing as indicated on Drawings. Notch to fit exterior wall plates and use metal framing anchors. Double rafters to form headers and trimmers at openings in roof framing, if any, and support with metal hangers. Where rafters abut at ridge, place directly opposite each other and nail to ridge member or use metal ridge hangers.
- B. Provide special framing as indicated for eaves, overhangs, dormers, and similar conditions, if any.

3.5 PROTECTION

- A. Use all necessary means to protect the installed work and materials of all other trades. In the event of damage, immediately make all repairs and replacements necessary to, the approval of the Architect and at no additional cost to the Owner.
- B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION

SECTION 070150
PREPARATION FOR RE-ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Full roof tear-off of areas indicated
2. Partial roof tear-off of areas indicated.
3. Temporary roofing membrane.
4. Roof re-cover preparation.
5. Removal of base flashings.

- B. Related Sections:

1. Division 01 Section "Summary" for use of the premises and phasing requirements.
2. Division 01 Section "Temporary Facilities and Controls" for temporary construction and environmental-protection measures for reroofing preparation.
3. Division 23 Sections as applicable for HVAC equipment removal and reinstallation.
4. Division 26 Sections as applicable for electrical equipment disconnection and reconnection.

1.3 MATERIALS OWNERSHIP

- A. Except for items or materials indicated to be reused, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.

1.4 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.
- B. Roof Re-Cover Preparation: Existing roofing system is to remain and be prepared for new roof installed over it.

- C. Roof Tear-Off: Removal of existing roofing system from deck.
- D. Partial Roof Tear-Off: Removal of a portion of existing membrane roofing system from deck or removal of selected components and accessories from existing membrane roofing system.
- E. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and reinstalled.
- F. Existing to Remain: Existing items of construction that are not to be removed and are to be protected during construction operations.

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Fastener pull-out test report.
- C. Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces, that might be misconstrued as having been damaged by reroofing operations. Submit before Work begins.
- D. Landfill Records: Indicate receipt and acceptance of hazardous wastes, such as asbestos-containing material, by a landfill facility licensed to accept hazardous wastes.
- E. Qualification Data: For Installer including certificate that Installer is licensed to perform asbestos abatement and is approved by warrantor of existing roofing system.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Installer of new membrane roofing system, licensed to perform asbestos abatement in the State or jurisdiction where Project is located and approved by warrantor of existing roofing system to work on existing roofing.
- B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning membrane roofing removal. Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Reroofing Conference: Conduct conference at Madera High School.
 - 1. Meet with Owner; Architect; Owner's insurer if applicable; testing and inspecting agency representative; roofing system manufacturer's representative; deck Installer; roofing Installer including project manager, superintendent, and foreman; and installers whose work interfaces with or affects reroofing including installers of roof accessories and roof-mounted equipment.
 - 2. Review methods and procedures related to roofing system tear-off and replacement including, but not limited to, the following:

- a. Reroofing preparation, including membrane roofing system manufacturer's written instructions.
- b. Temporary protection requirements for existing roofing system that is to remain during and after installation.
- c. Existing roof drains and roof drainage during each stage of reroofing, and roof drain plugging and plug removal requirements.
- d. Construction schedule and availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
- e. Existing deck removal procedures and Owner notifications.
- f. Condition and acceptance of existing roof deck and base flashing substrate for reuse.
- g. Structural loading limitations of deck during reroofing.
- h. Base flashings, special roofing details, drainage, penetrations, equipment curbs, and condition of other construction that will affect reroofing.
- i. HVAC shutdown and sealing of air intakes.
- j. Shutdown of fire-suppression, -protection, and -alarm and -detection systems.
- k. Asbestos removal and discovery of asbestos-containing materials.
- l. Governing regulations and requirements for insurance and certificates if applicable.
- m. Existing conditions that may require notification of Architect before proceeding.

1.7 FIELD CONDITIONS

- A. Existing Membrane Roofing System: [**Built-up asphalt**] [**Built-up coal-tar**] [**EPDM**] [**CSPE**] [**PVC**] [**TPO**] [**APP-modified bituminous**] [**SBS-modified bituminous**] <Insert roof type> roofing membrane, roof insulation, surfacing, and components and accessories between deck and roofing membrane.
- B. Owner may occupy portions of building immediately below reroofing area. Conduct reroofing so Owner's operations will not be disrupted. Provide Owner with not less than 72 hours' notice of activities that may affect Owner's operations.
 - 1. Coordinate work activities daily with Owner so Owner can place protective dust or water leakage covers over sensitive equipment or furnishings, shut down HVAC and fire-alarm or -detection equipment if needed, and evacuate occupants from below the work area.
 - 2. Before working over known structurally impaired areas of deck, notify Owner to evacuate occupants from below the affected area. Verify that occupants below the work area have been evacuated before proceeding with work over the impaired deck area.
- C. Protect building to be reroofed, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from reroofing operations.
- D. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.

- E. Conditions existing at time of inspection for bidding will be maintained by Owner as far as practical.
- F. Weather Limitations: Proceed with reroofing preparation only when existing and forecasted weather conditions permit Work to proceed without water entering existing roofing system or building.
- G. Hazardous Materials: It is not expected that hazardous materials such as asbestos-containing materials will be encountered in the Work.
 - 1. Hazardous materials will be removed by Owner before start of the Work. Existing roof will be left no less watertight than before removal.
 - 2. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- H. Hazardous Materials: Present in building to be reroofed. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.
 - 1. Hazardous material remediation is specified elsewhere in the Contract Documents.
 - 2. Do not disturb hazardous materials or items suspected of containing hazardous materials except according to procedures specified elsewhere in the Contract Documents.
 - 3. Coordinate with hazardous material remediation subcontractor to prevent water from entering existing roofing system or building.

1.8 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during reroofing, by methods and with materials so as not to void existing roofing system warranty. Notify warrantor before proceeding.
 - 1. Notify warrantor of existing roofing system on completion of reroofing, and obtain documentation verifying that existing roofing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

PART 2 - PRODUCTS

2.1 INFILL MATERIALS

- A. Use infill materials matching existing membrane roofing system materials unless otherwise indicated.
 - 1. Infill materials are specified in Division 07.

2.2 TEMPORARY ROOFING MATERIALS

- A. Design and selection of materials for temporary roofing are responsibilities of Contractor.
- B. Sheathing Paper: Red-rosin type, minimum 3 lb/100 sq. ft.
- C. Base Sheet: ASTM D 4601, Type II, nonperforated, asphalt-impregnated and -coated, glass-fiber sheet.
- D. Glass-Fiber Felts: ASTM D 2178, Type IV, asphalt-impregnated, glass-fiber felt.
- E. Asphalt Primer: ASTM D 41.
- F. Roofing Asphalt: ASTM D 312, Type III or IV.

2.3 RECOVER BOARDS

- A. Recover Board: ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board; 1/2 inch thick.
- B. Fasteners: Factory-coated steel fasteners, No. 12 and metal or plastic plates listed in FM Approval's "Approval Guide," designed for fastening recover boards to deck.

2.4 AUXILIARY REROOFING MATERIALS

- A. General: Auxiliary reroofing preparation materials recommended by roofing system manufacturer for intended use and compatible with components of existing and new membrane roofing system.
- B. Base Sheet Fasteners: Capped head, factory-coated steel fasteners, listed in FM Approval's "Approval Guide."
- C. Metal Flashing Sheet: Metal flashing sheet is specified in Division 07 Section "Sheet Metal Flashing and Trim."

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect existing membrane roofing system that is indicated not to be reroofed.
 - 1. Loosely lay 1-inch- minimum thick, molded expanded polystyrene (MEPS) insulation over the roofing membrane in areas indicated. Loosely lay 15/32-inch plywood or OSB panels over MEPS. Extend MEPS past edges of plywood or OSB panels a minimum of 1 inch.
 - 2. Limit traffic and material storage to areas of existing roofing membrane that have been protected.

3. Maintain temporary protection and leave in place until replacement roofing has been completed. Remove temporary protection on completion of reroofing.
- B. Coordinate with Owner to shut down air-intake equipment in the vicinity of the Work. Cover air-intake louvers before proceeding with reroofing work that could affect indoor air quality or activate smoke detectors in the ductwork.
- C. During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.
- D. Maintain roof drains in functioning condition to ensure roof drainage at end of each workday. Prevent debris from entering or blocking roof drains and conductors. Use roof-drain plugs specifically designed for this purpose. Remove roof-drain plugs at end of each workday, when no work is taking place, or when rain is forecast.
 1. If roof drains are temporarily blocked or unserviceable due to roofing system removal or partial installation of new membrane roofing system, provide alternative drainage method to remove water and eliminate ponding. Do not permit water to enter into or under existing membrane roofing system components that are to remain.
- E. Verify that rooftop utilities and service piping have been shut off before beginning the Work.

3.2 ROOF TEAR-OFF

- A. General: Notify Owner each day of extent of roof tear-off proposed for that day and obtain authorization to proceed.
- B. Remove aggregate ballast from roofing membrane. Store aggregate ballast for reuse.
- C. Remove loose aggregate from aggregate-surfaced built-up bituminous roofing using a power broom.
- D. Remove pavers and accessories from roofing membrane. Store and protect pavers and accessories for reuse. Discard cracked pavers.
- E. Remove protection mat and extruded-polystyrene insulation from protected roofing membrane.
 1. Discard extruded-polystyrene insulation that is wet and exceeds 8 lb/cu. ft.
 2. Store extruded-polystyrene insulation for reuse and protect from physical damage.
- F. Roof Tear-Off: Remove existing roofing membrane and other membrane roofing system components down to the deck.
 1. Remove cover boards roof insulation and substrate boards.
 2. Bitumen and felts that are firmly bonded to concrete decks are permitted to remain if felts are dry. Remove unadhered bitumen and felts and wet felts.

3. Remove excess asphalt from steel deck. A maximum of 15 lb/100 sq. ft. of asphalt is permitted to remain on steel decks.
 4. Remove fasteners from deck or cut fasteners off slightly above deck surface.
- G. Partial Roof Tear-Off: Where indicated, remove existing roofing membrane and other membrane roofing system components down to the deck.
1. Remove cover boards, roof insulation and substrate boards.
 2. Bitumen and felts that are firmly bonded to concrete decks are permitted to remain if felts are dry. Remove unadhered bitumen and felts and wet felts.
 3. Remove excess asphalt from steel deck. A maximum of 15 lb/100 sq. ft. of asphalt is permitted to remain on steel decks.
 4. Remove fasteners from deck or cut fasteners off slightly above deck surface.
- H. Partial Roof Tear-Off: Remove existing roofing membrane and immediately check for presence of moisture by visually observing cover boards, roof insulation and substrate boards that will remain.
1. Coordinate with Owner's inspector to schedule times for tests and inspections immediately after membrane removal.
 2. With an electrical capacitance moisture-detection meter, spot check cover boards, roof insulation and substrate boards that will remain.
 3. Remove wet or damp boards and roof insulation. Removal will be paid for by adjusting the Contract Sum according to unit prices included in the Contract Documents.
 4. Bitumen and felts that are firmly bonded to concrete decks are permitted to remain if felts are dry. Remove unadhered bitumen and felts and wet felts.
 5. Remove excess asphalt from steel deck. A maximum of 15 lb/100 sq. ft. of asphalt is permitted to remain on steel decks.
 6. Remove fasteners from deck or cut fasteners off slightly above deck surface.

3.3 DECK PREPARATION

- A. Inspect deck after partial tear-off of membrane roofing system.
- B. Verify that concrete substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263 or by pouring 1 pint of hot roofing asphalt on deck at start of each day's work and at start of each roof area or plane. Do not proceed with roofing work if moisture condenses under the plastic sheet or if asphalt test sample foams or can be easily and cleanly stripped after cooling.
- C. If broken or loose fasteners that secure deck panels to one another or to structure are observed or if deck appears or feels inadequately attached, immediately notify Architect. Do not proceed with installation until directed by Architect.
- D. If deck surface is not suitable for receiving new roofing or if structural integrity of deck is suspect, immediately notify Architect. Do not proceed with installation until directed by Architect.
- E. Provide additional deck securement as indicated on Drawings.

3.4 INFILL MATERIALS INSTALLATION

- A. Immediately after removal of selected portions of existing membrane roofing system, and inspection and repair, if needed, of deck, fill in the tear-off areas to match existing membrane roofing system construction.
 - 1. Installation of infill materials is specified in Division 07.
 - 2. Install new roofing membrane patch over roof infill area. If new roofing membrane is installed the same day tear-off is made, roofing membrane patch is not required.

3.5 TEMPORARY ROOFING MEMBRANE

- A. Install approved temporary roofing membrane over area to be reroofed.
- B. Install temporary roofing membrane over area to be reroofed. Install two glass-fiber felts lapping each sheet 19 inches over preceding sheet. Embed glass-fiber felt in a solid mopping of hot roofing asphalt applied within equiviscous temperature range. Glaze-coat completed surface with hot roofing asphalt.
- C. Remove temporary roofing membrane before installing new roofing membrane.
- D. Prepare the temporary roof to receive new roofing membrane according to approved temporary roofing membrane proposal. Restore temporary roofing membrane to watertight condition. Obtain approval for temporary roof substrate from roofing membrane manufacturer and Architect before installing new roof.

3.6 ROOF RE-COVER PREPARATION

- A. Remove blisters, ridges, buckles, and other substrate irregularities from existing roofing membrane that inhibit new recover boards from conforming to substrate.
 - 1. Remove loose aggregate from aggregate-surfaced built-up bituminous roofing with a power broom.
 - 2. Scarify the surface of sprayed polyurethane foam as necessary to achieve a sufficiently uniform plane to receive new recover boards.
 - 3. Broom clean existing substrate.
 - 4. Coordinate with Owner's inspector to schedule times for tests and inspections before proceeding with installation of recover boards.
 - 5. Verify that existing substrate is dry before proceeding with installation of recover boards. Spot check substrates with an electrical capacitance moisture-detection meter.
 - 6. Remove materials that are wet or damp. Removal will be paid for by adjusting the Contract Sum according to unit prices included in the Contract Documents.
- B. Remove blisters, ridges, buckles, and other substrate irregularities from existing roofing membrane that inhibit new roofing membrane from conforming to substrate.

1. Remove loose aggregate from aggregate-surfaced built-up bituminous roofing with a power broom.
2. Scarify the surface of sprayed polyurethane foam as necessary to achieve a sufficiently uniform plane to receive new roofing membrane.
3. Broom clean existing substrate.
4. Coordinate with Owner's inspector to schedule times for tests and inspections.
5. Verify that existing substrate is dry before proceeding with installation. Spot check substrates with an electrical capacitance moisture-detection meter.
6. Remove materials that are wet and damp. Removal will be paid for by adjusting the Contract Sum according to unit prices included in the Contract Documents.

C. Remove blisters and areas of membrane not fully adhered.

D. Remove substrate irregularities that inhibit new recover boards from conforming to substrate.

1. Remove loose aggregate from aggregate-surfaced built-up bituminous roofing with a power broom.
2. Clean substrate of contaminants such as dirt, debris, oil, and grease that can affect adhesion of coated foamed roofing.
3. Power vacuum the existing roof surface. If recommended by foam manufacturer, prime dried surface at recommended rate with recommended primer.
4. Scarify the surface of coated polyurethane roofing as necessary to achieve a suitable substrate for new roofing.
5. Retain first subparagraph below if additional fastening of existing roofing system is required. Perform numerous field-uplift tests during design stage to determine if existing roofing system is adequately attached. If attachment is inadequate, specify additional membrane fasteners or install a mechanically attached cover board.
6. Verify that surface is dry by pressing litmus paper to surface areas most likely to retain moisture, such as shaded areas and low spots. If paper changes color, surface is too wet to apply foam.
7. Build up isolated low spots on existing roofing membrane with sprayed foam specified in Division 07 Section "Coated Foamed Roofing" to prevent ponding.

3.7 EXISTING BASE FLASHINGS

A. Remove existing base flashings around parapets, curbs, walls, and penetrations.

1. Clean substrates of contaminants such as asphalt, sheet materials, dirt, and debris.

B. Do not damage metal counterflashings that are to remain. Replace metal counterflashings damaged during removal with counterflashings specified in Division 07 Section "Sheet Metal Flashing and Trim."

C. Inspect parapet sheathing for deterioration and damage. If parapet sheathing has deteriorated, immediately notify Architect.

3.8 FASTENER PULL-OUT TESTING

- A. Perform fastener pull-out tests according to SPRI FX-1, and submit test report to Architect before installing new membrane roofing system.
 - 1. Obtain Architect's approval to proceed with specified fastening pattern. Architect may furnish revised fastening pattern commensurate with pull-out test results.

3.9 RECOVER BOARD INSTALLATION

- A. Install recover boards over roofing membrane with long joints in continuous straight lines and end joints staggered between rows. Loosely butt recover boards together and fasten to deck.
 - 1. Tape joints of recover boards if required by roofing membrane manufacturer.
 - 2. Fasten recover boards to resist wind-uplift pressure at corners, perimeter, and field of roof specified in Division 07.
 - 3. Install additional fasteners near board corners and edges as necessary to conform boards to substrate and to adjacent boards.

3.10 DISPOSAL

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

END OF SECTION

SECTION 075100
MEMBRANE ROOFING PATCHING AND REPAIR

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Roof membrane cutting and patching, including roof insulation, for cutting and patching roof systems to accommodate work of the project.
2. Verification of composition of materials and systems of existing roof systems.

B. Related Requirements:

1. Division 01 Section "Execution" for cutting and patching procedures.
2. Division 02 Section "Selective Demolition" for demolition and removal of selected portions of a building or structure.
3. Section 076200 "Sheet Metal Flashing and Trim" for metal roof flashings and counter flashings.
4. Section 079200 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

1.3 DEFINITIONS

- A. Roofing Terminology: Definitions in ASTM D1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" apply to Work of this Section.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner, Owner's Inspector if applicable, roofing Installer, roofing manufacturer's representative if applicable, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing Work, including manufacturer's written instructions.
3. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing.

4. Review temporary protection requirements for roofing during and after installation.
5. Review roof observation and repair procedures after roofing installation.

1.5 SUBMITTALS

- A. Product and Materials List: Submit list of products and materials to be incorporated into the Work.
- B. Product Data: For each type of product.
- C. Verification of Existing Roof Systems: List of products and materials of each existing roof system affected by the Work; include manufacturer and product names, material thicknesses, material compositions, original installer, and warranty information.
- D. Patching and Repair Methods: Patching and repair methods for each type of existing roof system affected by the Work. Include description of existing roof system, patching materials, installation methods, and detail drawings.
- E. Qualification Data: For Installer.
- F. Warranties: Documentation indicating that existing warranties are still in effect after completion of patching and repair.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roof system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.7 DELIVERY, STORAGE, AND HANDLING

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

- D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.8 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing to be installed according to manufacturer's written instructions and warranty requirements.
- B. Hazardous Materials: It is expected that hazardous materials will not be encountered in the Work.
 - 1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

1.9 WARRANTY

- A. Existing Warranties: Verify with Owner to ascertain the existence of existing roof warranties.
 - 1. Remove, patch, and repair roof systems using materials and methods so as to not void existing warranties. Notify warrantor before proceeding.
 - 2. Notify warrantor on completion of work and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.
- B. Warranty Limitations: Warranties required by this Section shall be limited to the roofing Work required for this Project and shall not apply to existing roof system where no work is to be performed.
- C. Special Project Warranty: Submit roofing Installer's warranty, signed by Installer, covering the Work of this Section, including all components of roof patching and repair such as roof membrane, base flashing, roof insulation, fasteners, cover boards, and walkway products, for the following warranty period:
 - 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Material Compatibility: Materials for patching existing roof system shall be compatible with one another, with existing roof system materials, and under conditions of service and application required, as demonstrated by roofing materials manufacturer(s) based on testing and field experience.

- B. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Built-up roofing and base flashings shall remain watertight.
 - 1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
 - 2. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D 3746 or ASTM D4272.
- C. Roofing System Design: Tested by a qualified testing agency to resist uplift pressures according to AISI/SEI 7 for the Project location.
- D. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

2.2 ROOFING AND FLASHING MEMBRANE SHEET MATERIALS

- A. General: Verify existing roof system membrane materials and provide roofing and flashing membrane sheet materials that are compatible with existing roof system. Materials shall be designed for cold applied installation to prevent thermal shock to existing roofing system caused by hot mopping.
- B. Source Limitations: Obtain components for patching and repair of roof systems from existing roof system manufacturer or approved by existing roof system manufacturer.

2.3 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing manufacturer for intended use and compatible with built-up roofing.
 - 1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
 - 2. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the following limits for VOC content:
 - a. Plastic Foam Adhesives: 50 g/L.
 - b. Gypsum Board and Panel Adhesives: 50 g/L.
 - c. Multipurpose Construction Adhesives: 70 g/L.
 - d. Fiberglass Adhesives: 80 g/L.
 - e. Contact Adhesives: 80 g/L.
 - f. Other Adhesives: 250 g/L.
 - g. Nonmembrane Roof Sealants: 300 g/L.
 - h. Sealant Primers for Nonporous Substrates: 250 g/L.
 - i. Sealant Primers for Porous Substrates: 775 g/L.
- B. Asphalt Primer: ASTM D 41/D 41M.

- C. Cold-Applied Adhesive: Roofing manufacturer's standard asphalt-based, one or two-part, asbestos-free, cold-applied adhesive specially formulated for compatibility and use with built-up base flashings.
- D. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required by roofing manufacturer for application.
- E. Mastic Sealant: Polyisobutylene, plain or modified bitumen; nonhardening, nonmigrating, nonskinning, and nondrying.
- F. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening built-up roofing components to substrate; tested by manufacturer for required pullout strength, and acceptable to roofing manufacturer.
- G. Miscellaneous Accessories: Provide those recommended by roofing system manufacturer.

2.4 ROOF INSULATION AND INSULATION ACCESSORIES

- A. Board Insulation, General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated. Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with built-up roofing.
 - 1. General: Verify existing insulation materials and provide insulation materials that are compatible with existing insulation and roof system. Materials shall be designed for cold applied installation to prevent thermal shock to existing roofing system caused by hot mopping.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
- C. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes required for project conditions, not less than 1/4 inch per 12 inches.
- D. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roof insulation to substrate and acceptable to roofing manufacturer.
- E. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:
 - 1. Modified asphaltic, asbestos-free, cold-applied adhesive.
- F. Insulation Cant Strips: ASTM C 728, perlite insulation board or ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.

- G. Wood Nailer Strips: Comply with requirements in Division 06 Section "Miscellaneous Rough Carpentry."
- H. Tapered Edge Strips: ASTM C 728, perlite insulation board or ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.
- I. Cover Board: ASTM C 208, Type II, Grade 2, cellulosic-fiber insulation board, 1/2 inch thick.
- J. Substrate Joint Tape: 6 or 8-inchwide, coated, glass fiber.

PART 3 - EXECUTION

3.1 ROOFING REMOVAL

- A. General: Remove existing roof system only to the extent required for Work of the Project and as indicated. Use methods required to complete the Work within limitations of governing regulations.
 - 1. Comply with requirements of Division 02 Section "Selective Demolition."
- B. Protect existing roof where no work is to be performed.

3.2 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work:
 - 1. Verify existing roof system conditions are the same as conditions assumed for proposing patching and repair of the roof.
 - 2. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
 - 3. Verify that cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
 - 4. Verify that concrete substrates are visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 PREPARATION

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

- C. Protect existing roof where no work is to be performed.
- D. Prime surface of concrete deck with asphalt primer at a rate of 3/4 gal./100 sq. ft and allow primer to dry.

3.4 INSTALLATION

- A. Patch and repair roof systems according to roofing manufacturer's written instructions, recommendations of ARMA/NRCA applicable to patching and repairing, and to be compatible with existing roofing system.
- B. Insulation: Install insulation in thickness to match existing insulation.
- C. Cover Boards: Install cover boards over insulation to match existing conditions.
- D. Cant Strips: Install and secure preformed 45-degree insulation cant strips at junctures of built-up roofing with vertical surfaces or angle changes greater than 45 degrees.
- E. Crickets: Provide crickets of tapered insulation where required for drainage around curbs and similar drainage obstructions.
- F. Membrane Roofing Materials:
 - 1. Apply membrane materials with cold process methods.
 - 2. Install membrane materials matching number of plies of existing roofing system.
 - 3. Ply Sheets: Lap ply sheets and shingle in direction to shed water. Extend ply sheets over and terminate beyond cants.
 - 4. Cap Sheet: Install lapped granulated cap sheet starting at low point of roofing. Offset laps from laps of preceding ply sheets, and align cap sheet without stretching. Lap in direction to shed water. Extend cap sheet over and terminate beyond cants.
 - 5. Install base flashing over cant strips and other sloping and vertical surfaces, at roof edges, and at penetrations through roof; secure to substrates according to built-up roofing manufacturer's written instructions.

3.5 FIELD QUALITY CONTROL

- A. Roof Inspection: Where existing warranties are in place, arrange for roofing system Manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.

3.6 PROTECTING AND CLEANING

- A. Protect roofing from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

- B. Correct deficiencies in patching and repair of roof systems that do not comply with requirements. Repair to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

SECTION 075114
BUILT-UP ASPHALT ROOFING CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Roof tear off at locations of new roof equipment.
2. Patching built-up asphalt roofing.
3. Protection of existing roof system.

B. Related Requirements:

1. Division 01 Section "Execution" for cutting and patching procedures.
2. Division 02 Section "Selective Demolition" for demolition and removal of selected portions of a building or structure.
3. Division 07 Section "Sheet Metal Flashing and Trim" for metal roof flashings and counter flashings.
4. Division 07 Section "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

1.3 DEFINITIONS

- A. Roofing Terminology: Definitions in ASTM D1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" apply to Work of this Section.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's Inspector if applicable, roofing Installer, roofing manufacturer's representative, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing Work, including manufacturer's written instructions.
3. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing.

4. Review temporary protection requirements for roofing during and after installation.
5. Review roof observation and repair procedures after roofing installation.

1.5 SUBMITTALS

- A. Product Data: For each type of product.
- B. Proposed Method for Patching Roof System: Submit proposed method for patching/repairing existing roof system. Include description of existing roof system, patching materials, installation methods, and drawings.
- C. Qualification Data: For Installer.
- D. Manufacturer Certificates: Signed by roofing manufacturer certifying that built-up roofing complies with requirements specified in "Performance Requirements" Article.
- E. Maintenance Data: For built-up roofing to include in maintenance manuals.
- F. Warranties: Documentation indicated that existing warranties are still in effect after completion of patching.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by built-up roofing manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.7 DELIVERY, STORAGE, AND HANDLING

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

- D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.8 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing to be installed according to manufacturer's written instructions and warranty requirements.
- B. Hazardous Materials: It is expected that hazardous materials will be not be encountered in the Work.
 - 1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

1.9 WARRANTY

- A. Existing Warranties: Verify with Owner to ascertain the existence of an existing roof warranty.
 - 1. Remove, replace, patch, and repair materials and surfaces cut or damaged by methods and with materials so as not to void existing warranties. Notify warrantor before proceeding.
 - 2. Notify warrantor on completion of work and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.
- B. Warranty Limitations: Warranties required by this Section shall be limited to the roofing Work required for this Project and shall not apply to existing roof system where no work is to be performed.
- C. Special Warranty: Manufacturer agrees to repair or replace components of built-up roofing work that fail in materials or workmanship within specified warranty period.
 - 1. Special warranty includes built-up roofing membrane, base flashings, roof insulation, fasteners, cover boards, roofing accessories, and other components of built-up roofing system required for Work of this Project.
 - 2. Warranty Period: 10 years from date of Substantial Completion.
- D. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section, including all components of built-up roofing such as built-up roofing membrane, base flashing, roof insulation, fasteners, cover boards, and walkway products, for the following warranty period:
 - 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Subject to compliance with requirements, provide products by, or approved by, the following:
 - 1. Existing Roof System Manufacturer (Verify manufacturer).
 - a. When existing roof system manufacturer cannot be determined, subject to compliance with requirements, provide products by one of the following:
 - 1) GAF Materials Corporation.
 - 2) Johns Manville.
 - 3) Malarkey Roofing Company.
 - 4) Tremco Incorporated.
- B. Source Limitations: Obtain components for patching roof system from roof system manufacturer or manufacturer(s) approved by roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Material Compatibility: Materials for patching existing roof system shall be compatible with one another, with existing roof system materials, and under conditions of service and application required, as demonstrated by roofing materials manufacturer(s) based on testing and field experience.
- B. General Performance: Installed built-up roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Built-up roofing and base flashings shall remain watertight.
 - 1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
 - 2. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D 3746 or ASTM D4272.
- C. Roofing System Design: Tested by a qualified testing agency to resist uplift pressures according to AISC/SEI 7 for the Project location.
- D. Solar Reflectance Index: Not less than 78 when calculated according to ASTM E 1980, based on testing identical products by a qualified testing agency.
- E. Energy Performance: Roofing system shall have an initial solar reflectance index of not less than 0.70 and an emissivity of not less than 0.75 when tested according to CRRC-1.

- F. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

2.3 ROOFING AND FLASHING MEMBRANE SHEET MATERIALS

- A. General: Verify existing roof system membrane materials and provide roofing and flashing membrane sheet materials that are compatible with existing roof system. Materials shall be designed for cold applied installation to prevent thermal shock to existing roofing system caused by hot mopping.

2.4 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing manufacturer for intended use and compatible with built-up roofing.
 - 1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
 - 2. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the following limits for VOC content:
 - a. Plastic Foam Adhesives: 50 g/L.
 - b. Gypsum Board and Panel Adhesives: 50 g/L.
 - c. Multipurpose Construction Adhesives: 70 g/L.
 - d. Fiberglass Adhesives: 80 g/L.
 - e. Contact Adhesives: 80 g/L.
 - f. Other Adhesives: 250 g/L.
 - g. Nonmembrane Roof Sealants: 300 g/L.
 - h. Sealant Primers for Nonporous Substrates: 250 g/L.
 - i. Sealant Primers for Porous Substrates: 775 g/L.
- B. Asphalt Primer: ASTM D 41/D 41M.
- C. Cold-Applied Adhesive: Roofing manufacturer's standard asphalt-based, one or two-part, asbestos-free, cold-applied adhesive specially formulated for compatibility and use with built-up base flashings.
- D. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required by roofing manufacturer for application.
- E. Mastic Sealant: Polyisobutylene, plain or modified bitumen; nonhardening, nonmigrating, nonskinning, and nondrying.
- F. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening built-up roofing components to substrate; tested by manufacturer for required pullout strength, and acceptable to roofing manufacturer.

- G. Miscellaneous Accessories: Provide those recommended by roofing system manufacturer.

2.5 ROOF INSULATION AND INSULATION ACCESSORIES

- A. General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated. Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with built-up roofing.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
- C. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes required for project conditions, not less than 1/4 inch per 12 inches.
- D. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roof insulation to substrate and acceptable to roofing manufacturer.
- E. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:
 - 1. Modified asphaltic, asbestos-free, cold-applied adhesive.
- F. Insulation Cant Strips: ASTM C 728, perlite insulation board or ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.
- G. Wood Nailer Strips: Comply with requirements in Division 06 Section "Rough Carpentry."
- H. Tapered Edge Strips: ASTM C 728, perlite insulation board or ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.
- I. Cover Board: ASTM C 208, Type II, Grade 2, cellulosic-fiber insulation board, 1/2 inch thick.
- J. Substrate Joint Tape: 6 or 8-inch wide, coated, glass fiber.

2.6 COATING MATERIALS

- A. Roof Coating: Acrylic elastomer emulsion coating, formulated for use on bituminous roof surfaces and complying with ASTM D 6083.
 - 1. Color: White.

PART 3 - EXECUTION

3.1 ROOFING REMOVAL

- A. General: Remove existing roof system only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations.
 - 1. Comply with requirements of Division 02 Section "Selective Demolition."
- B. Protect existing roof where no work is to be performed.

3.2 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work:
 - 1. Verify existing roof system conditions are the same as conditions assumed for proposing patching and repair of the roof.
 - 2. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
 - 3. Verify that cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 PREPARATION

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

3.4 INSTALLATION

- A. Patch and install roofing according to roofing manufacturer's written instructions, recommendations of ARMA/NRCA applicable to patching and installing built-up roofing, and to be compatible with existing roofing system.
- B. Insulation: Install insulation in thickness to match existing insulation.
- C. Cover Boards: Install cover boards over insulation to match existing conditions.

- D. Cant Strips: Install and secure preformed 45-degree insulation cant strips at junctures of built-up roofing with vertical surfaces or angle changes greater than 45 degrees.
- E. Crickets: Provide crickets of tapered insulation where required for drainage around curbs and similar drainage obstructions.
- F. Membrane Roofing Materials:
 - 1. Apply membrane materials with cold process methods.
 - 2. Install membrane materials matching number of plies of existing roofing system.
 - 3. Ply Sheets: Lap ply sheets and shingle in direction to shed water. Extend ply sheets over and terminate beyond cants.
 - 4. Cap Sheet: Install lapped granulated cap sheet starting at low point of roofing. Offset laps from laps of preceding ply sheets, and align cap sheet without stretching. Lap in direction to shed water. Extend cap sheet over and terminate beyond cants.
 - 5. Install base flashing over cant strips and other sloping and vertical surfaces, at roof edges, and at penetrations through roof; secure to substrates according to built-up roofing manufacturer's written instructions.

3.5 COATING INSTALLATION

- A. Apply coating to built-up roofing and base flashings according to manufacturer's written instructions, by spray, roller, or other suitable application method to provide a dry film thickness of not less than 20 mils.

3.6 WALKWAY INSTALLATION

- A. Walkway Pads: Install walkway pads according to walkway pad manufacturer's written instructions.
 - 1. Set walkway pads cold adhesive after sweeping away loose aggregate surfacing. Provide 3 to 6 inch space between walkway pads to allow for drainage.

3.7 FIELD QUALITY CONTROL

- A. Roof Inspection: Where existing warranties are in place, arrange for roofing system Manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.

3.8 PROTECTING AND CLEANING

- A. Protect built-up roofing from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

- B. Correct deficiencies in or remove built-up roofing that does not comply with requirements, repair substrates, and repair or reinstall roofing to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.9 ROOFING INSTALLER'S WARRANTY

- A. WHEREAS _____ of _____, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:
 - 1. Owner: Madera Unified School District
 - 2. Address: 1902 Howard Rd, Madera, CA 93637
 - 3. Building Name/Type: Madera High School
 - 4. Address: 200 S L St., Madera, CA 93637
 - 5. Area of Work: Joe Flores Gym
- B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,
- C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.
- D. This Warranty is made subject to the following terms and conditions:
 - 1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
 - a. lightning;
 - b. peak gust wind speed exceeding 90 mph;
 - c. fire;
 - d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
 - e. failures of the existing roofing system outside the area of the work of this project;
 - f. faulty construction of parapet walls, copings, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
 - g. vapor condensation on bottom of roofing; and
 - h. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this _____ day of _____, _____.

1. Authorized Signature: _____.
2. Name: _____.
3. Title: _____.

END OF SECTION

SECTION 076200
SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Manufactured Sheet Metal Flashing Products:
 - a. Manufactured reglets and counter flashing.
- 2. Formed sheet metal fabrications:
 - a. Flashing and trim.
 - b. Copings.
 - c. Miscellaneous sheet metal fabrications.

- B. Related Sections include the following:

- 1. Division 06 Section "Rough Carpentry" for wood nailers, curbs, and blocking.
- 2. Division 07 Sections as applicable to metal roof and wall panels for sheet metal flashing and trim integral with metal roof and wall panel systems.
- 3. Division 07 Sections as applicable to roofing for sheet metal flashing and trim integral with roofing systems.
- 4. Division 07 Section "Joint Sealants" for field-applied sheet metal flashing and trim sealants.
- 5. Division 13 Section "Metal Building Systems" for sheet metal integral with metal building roof and wall panel systems.

1.3 COORDINATION

- A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
- B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.4 SUBMITTALS

- A. Product Data: For each type of manufactured product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.
- B. Shop Drawings: For fabricated sheet metal items. Show fabrication and installation layouts including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop and field-assembled work. Include the following:
 - 1. Identification of material, thickness, weight, and finish for each item and location in Project.
 - 2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
 - 3. Details for joining, supporting, and securing sheet metal flashing and trim, including layout of fasteners, cleats, clips, and other attachments. Include pattern of seams.
 - 4. Details of termination points and assemblies, including fixed points.
 - 5. Details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction.
 - 6. Details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
 - 7. Details of special conditions.
 - 8. Details of connections to adjoining work.
 - 9. Detail formed flashing and trim at a scale of not less than 3 inches per 12 inches.
- C. Sample Warranty: For special warranty.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Entity that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
 - 1. For copings and roof edge flashings that are SPRI ES-1 tested, shop shall be listed as able to fabricate required details as tested and approved.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

1.7 WARRANTY

- A. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The Roofing and Waterproofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements as applicable for dimensions and profiles shown unless more stringent requirements are indicated.
- C. SPRI Wind Design Standard: Manufacture and install copings and roof edge flashings tested according to SPRI ES-1 and capable of resisting the following design pressures:
 - 1. Horizontal Outward Pressure: 24 psf.
 - 2. Vertical Upward Pressure: 75 psf.
- D. Thermal Movements: Sheet metal flashing and trim shall allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements.
 - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.
- B. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface.
 - 1. As-Milled Finish: Mill finish.
 - 2. Clear Anodic Finish, Coil Coated: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.
 - 3. Color Anodic Finish, Coil Coated: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
 - 4. Coil-Coated Finishes:
 - a. Exposed Coil-Coated Finish: Two-coat Fluoropolymer; AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - b. Exposed Coil-Coated Finish: Three-coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - c. Exposed Coil-Coated Finish: Siliconized polyester; epoxy primer and silicone-modified, polyester-enamel topcoat; with a dry film thickness of not less than 0.2 mil for primer and 0.8 mil for topcoat.
 - 1) Color: As selected by Architect from manufacturer's full range.
 - d. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.
- C. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet according to ASTM A 653/A 653M, G90 coating designation or aluminum-zinc alloy-coated steel sheet according to ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40; prepainted by coil-coating process to comply with ASTM A 755/A 755M.
 - 1. Surface: Smooth, flat **and with manufacturer's standard clear acrylic coating on both sides.**
 - 2. Coil-Coated Finish:
 - a. Exposed Coil-Coated Finish: Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal

surfaces to comply with coating and resin manufacturers' written instructions.

- b. Exposed Coil-Coated Finish: Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
- c. Exposed Coil-Coated Finish: Siliconized Polyester: Epoxy primer and silicone-modified, polyester-enamel topcoat; with dry film thickness of not less than 0.2 mil for primer and 0.8 mil for topcoat.
 - 1) Color: As selected by Architect from manufacturer's full range.
- d. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

2.3 UNDERLAYMENT MATERIALS

- A. Polyethylene Sheet: 6-mil thick polyethylene sheet complying with ASTM D 4397.
- B. Felt: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
- C. Self-Adhering, High-Temperature Sheet: Minimum 30 mils thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
 - 1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F.
 - 2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F.
 - 3. Products: Subject to compliance with requirements, provide one of the following:
 - a. Carlisle Coatings & Waterproofing Inc.; CCW WIP 300HT.
 - b. Grace Construction Products, a unit of W. R. Grace & Co.; Ultra.
 - c. Henry Company; Blueskin PE200 HT.
 - d. Metal-Fab Manufacturing, LLC; MetShield.
 - e. Owens Corning; WeatherLock Metal High Temperature Underlayment.

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.

1. Self-drilling screws, gasketed, with hex-washer head.
 2. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
 3. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
 4. Fasteners for Zinc-Coated (Galvanized) or Aluminum-Zinc Alloy-Coated Steel Sheet: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329 or Series 300 stainless steel.
- C. Solder for Zinc-Coated (Galvanized) Steel: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead or Grade Sn60, 60 percent tin and 40 percent lead.
- D. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
- E. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane, polysulfide, or silicone polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.
- H. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.
- I. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.5 MANUFACTURED SHEET METAL FLASHING AND TRIM

- A. Reglets: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with factory-mitered and welded corners and junctions.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Fry Reglet Corporation.
 - b. Heckmann Building Products Inc.
 - c. Hickman, W. P. Company.
 2. Material: Galvanized steel, 0.0217 inch thick.
 3. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers and with channel for sealant at top edge.

4. Stucco Type: Provide with upturned fastening flange and extension leg of length to match thickness of applied finish materials.
5. Concrete Type: Provide temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.
6. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.
7. Flexible Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.
8. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.

2.6 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim as indicated on Drawings and to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.
 1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
 2. Obtain field measurements for accurate fit before shop fabrication.
 3. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
 4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
- C. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant.
- D. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
- E. Fabricate cleats and attachment devices from same material as accessory being anchored and of sizes as recommended by SMACNA's "Architectural Sheet Metal Manual" for application, but not less than thickness of metal being secured.
- F. Seams: Fabricate nonmoving seams with flat-lock seams and as follows:

1. Seams for Pre-Finished Metal: Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.
2. Seams for Unfinished Sheet Steel: Tin edges to be seamed, form seams, and solder.
3. Seams for Unfinished Aluminum: Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.

G. Do not use graphite pencils to mark metal surfaces.

H. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.

2.7 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

A. Roof Edge Flashing and Fascia Caps: Fabricate in minimum 96-inch long, but not exceeding 10 foot long, sections. Furnish with 6-inch wide joint cover plates. Fabricate from 0.028 inch (24 gage) thick galvanized steel.

1. Joint Style: Lap, 4 inches wide.

B. Copings: Fabricate to cross section indicated in minimum 96-inch long, but not exceeding 10 foot long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and drill elongated holes for fasteners on interior leg. Miter corners, seal, and solder or weld watertight. Fabricate from 0.028 inch (24 gage) thick galvanized steel.

1. Joint Style: Butt, with 12-inch wide, concealed backup plate and 6-inch wide, exposed cover plates

C. Counterflashing: Fabricate from 0.028 inch (24 gage) thick galvanized steel.

D. Roof-Penetration Flashing: Fabricate from 0.028 inch (24 gage) thick galvanized steel.

E. Roof-Drain Flashing: Fabricate from zinc-tin alloy-coated stainless steel, 0.015 inch thick.

2.8 WALL SHEET METAL FABRICATIONS

A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch long, but not exceeding 12 foot long, sections, under copings, at shelf angles, and where indicated. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches beyond each side of wall openings. Form with 2-inch high end dams. Fabricate from 0.028 inch (24 gage) thick galvanized steel.

B. Wall Expansion-Joint Cover: Fabricate from 0.028 inch (24 gage) thick galvanized steel.

2.9 MISCELLANEOUS SHEET METAL FABRICATIONS

- A. Miscellaneous Sheet Metal Fabrications: Fabricate from 0.028 inch (24 gage) thick galvanized steel unless otherwise indicated.

2.10 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of work.
 - 1. Verify compliance with requirements for installation tolerances of substrates.
 - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

- A. Polyethylene Sheet: Install polyethylene sheet with adhesive for anchorage to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped and taped joints of not less than 2 inches.
- B. Felt Underlayment: Install felt underlayment with adhesive for temporary anchorage to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.
- C. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment wrinkle free. Apply primer if required by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches

between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.

3.3 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 - 1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
 - 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 - 3. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
 - 4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
 - 5. Install sealant tape where indicated.
 - 6. Torch cutting of sheet metal flashing and trim is not permitted.
 - 7. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.
 - 1. Coat back side of uncoated aluminum sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
 - 2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corners or intersections. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
- D. Fastener Sizes:
 - 1. Wood Framing, Blocking, and Sheathing: Use fasteners of sizes that will penetrate [wood sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.
 - 2. Metal Framing, Backing, and Decking: Use fasteners of sizes that will penetrate metal framing, backing, and decking not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Seal joints as shown and as required for watertight construction.

1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
 2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."
- F. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches, except reduce pre-tinning where pre-tinned surface would show in completed Work.
1. Do not solder coil-coated steel and aluminum sheet.
 2. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
- G. Rivets: Rivet joints in uncoated aluminum where indicated and where necessary for strength.

3.4 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements, SMACNA's "Architectural Sheet Metal Manual," and NRCA's Roofing and Waterproofing Manuals as applicable to project conditions. Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to referenced requirements and as indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at 16 inch centers.
- C. Copings: Anchor to resist uplift and outward forces according to recommendations in SMACNA's "Architectural Sheet Metal Manual" and as indicated.
1. Interlock exterior bottom edge of coping with continuous cleat anchored to substrate at 16-inch centers.
 2. Anchor interior leg of coping with washers and screw fasteners through slotted holes at 24-inch centers.
- D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.
- E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with sealant. Secure in a waterproof manner by means of snap-in installation and sealant or lead wedges and sealant.

- F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

3.5 WALL FLASHING INSTALLATION

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Reglets and Counterflashing: Install in accordance with manufacturer's written installation instructions.
- C. Openings Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings, unless shown otherwise on the drawings.

3.6 MISCELLANEOUS FLASHING INSTALLATION

- A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

3.7 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.8 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder and sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.
- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 078413
PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Penetration firestopping systems for the following applications:
 - a. Penetrations in fire-resistance-rated walls.
 - b. Penetrations in horizontal assemblies.
 - c. Penetrations in smoke barriers.
- 2. Identification of penetration firestopping.
- 3. Identification of fire separation walls.

B. Related Sections:

- 1. Division 09 Section "Gypsum Board" for top of wall framing conditions.
- 2. Division 21, 22, and 23 Sections as applicable to penetrations of fire rated construction by pipes and ducts for plumbing and mechanical work.
- 3. Division 26 through 28 Sections as applicable to penetrations of fire rated construction by conduit and wiring for electrical, communication, and electronic security work.

1.3 SUBMITTALS

A. Product Data: For each type of product.

B. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.

- 1. Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Obtain approval of authorities having jurisdiction prior to submittal.

- C. Qualification Data: For qualified Installer.
- D. Product Test Reports: For each penetration firestopping system, for tests performed by a qualified testing agency.
- E. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that has been approved by FM Approval according to FM Approval 4991, "Approval Standard for Firestop Contractors," or has been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements;" and who employs installers experienced in installing penetration firestopping similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance.
- B. Preinstallation Conference: Conduct conference at Project site.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

1.6 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.
- C. Notify Owner's testing agency at least seven days in advance of penetration firestopping installations; confirm dates and times on day preceding each series of installations.
- D. Do not cover up penetration firestopping system installations that will become concealed behind other construction until each installation has been labeled, examined by Owner's inspecting agency, and building inspector if required by authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Penetration Firestopping Systems: Penetration firestopping systems shall resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
- B. Each penetration firestopping system shall be in accordance with firestopping systems tested and approved by one of the following:
 - 1. UL in its "Fire Resistance Directory."
 - 2. Intertek Group in its "Directory of Listed Building Products."
 - 3. FM Approval in its "Approval Guide."
- C. Penetration firestopping systems shall be identical to those tested per testing standard indicated.

2.2 PENETRATION FIRESTOPPING SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Grace Construction Products.
 - 2. Hilti, Inc.
 - 3. 3M Fire Protection Products.
- B. Wall Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
 - 1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Floor/Ceiling Penetrations in Fire-Resistance-Rated Horizontal Assemblies: Penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
 - 1. F-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated.
 - 2. T-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
 - 3. W-Rating: Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.
- D. Exposed Penetration Firestopping: Products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

- E. VOC Content of Firestopping Sealants: Provide penetration firestopping sealants that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - 1. Sealants: 250 g/L.
 - 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 - 3. Sealant Primers for Porous Substrates: 775 g/L.
- F. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.
 - 1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-wool-fiber or rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
 - 2. Substrate primers.
 - 3. Collars.
 - 4. Steel sleeves.

2.3 FILL MATERIALS

- A. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.
- B. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- C. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized-steel sheet.
- D. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, or inorganic fibers.
- E. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- F. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- G. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and

fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.

- H. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- I. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and sloped surfaces, unless indicated firestopping limits use of nonsag grade for both opening conditions.

2.4 MIXING

- A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing penetration firestopping to comply with manufacturer's written instructions and with the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.

- B. Priming: Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking: Use masking tape to prevent penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing firestopping's seal with substrates.

3.3 INSTALLATION

- A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.
 - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.
- C. Install fill materials for firestopping by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Wall Identification: Fire walls, fire barriers, fire partitions, smoke barriers, smoke partitions, or any other wall required to have protected openings or penetrations, shall be permanently identified in accessible concealed floor, floor/ceiling, or attic spaces, with signs or stenciling as required by 2019 CBC Section 703.7. Identification shall:
 - 1. Be located in accessible concealed floor, floor/ceiling, or attic spaces.
 - 2. Be located within 15 feet of the end of each wall and at intervals not exceeding 30 feet horizontal distance measured along the wall or partition.
 - 3. Include lettering not less than 3 inches in height having a 3/8 inch minimum stroke width in a color contrasting with the wall, and incorporating the suggested wording "Fire and/or Smoke Barrier - Protect all Openings" or similar wording.

- B. Identification of Penetration Firestopping: Identify penetration firestopping with preprinted metal or plastic labels at each surface penetrated. Attach labels permanently to surfaces adjacent to and within 6 inches of firestopping edge so labels will be visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
1. The words "Penetration Firestopping - Do Not Disturb."
 2. Applicable firestopping system designation and testing and inspecting agency.
 3. Manufacturer's name.
 4. Date of installation.
 5. Contractor's name, address, and phone number.
 6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Testing and Inspecting Agency: Owner will engage and pay for a qualified independent testing and inspecting agency to perform tests and inspections as applicable and prepare reports.
1. Testing and Inspection Agency shall be acceptable to the Architect and the Division of the State Architect.
 2. Testing and inspecting agency will report test results promptly and in writing to Architect, Division of the State Architect, and Contractor.
 3. The cost of additional testing and inspecting of corrected, replaced and/or additional Work will be paid for by the Owner and the cost will be deducted from the contract sum by a change order.
- B. The Architect and the Division of the State Architect shall have the right to order the testing of any materials used in the steel construction to determine if they are of the quality specified.
- C. Contractor Duties and Responsibilities:
1. Contractor shall maintain control of the quality of materials and workmanship to conform to the drawings and specifications.
 2. Facilitate testing and inspection as follows:
 - a. Schedule tests and inspections with the Testing and Inspection Agency sufficiently in advance of operations to allow for the assignment of personnel and for the completion of testing and inspecting responsibilities.
 - b. Provide access to the Work for the designated Testing and Inspection Agency.
 - c. Furnish all necessary materials and labor to assist the designated testing and inspecting agency in obtaining and handling samples at the project or other sources of materials.

3. Contractor shall correct deficiencies in the Work where tests and inspections indicate the Work does not comply with the Contract Documents.
- D. Tests and Inspections: Testing of penetration firestopping shall be conducted by an approved testing agency in accordance with ASTM E 2174.
- E. Where deficiencies are found or penetration firestopping is damaged or removed because of testing, repair or replace penetration firestopping to comply with requirements.
- F. Proceed with enclosing penetration firestopping with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping is without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping and install new materials to produce systems complying with specified requirements.

3.7 PENETRATION FIRESTOPPING SCHEDULE

- A. Provide UL-classified systems indicated as referenced to system numbers in UL's "Fire Resistance Directory" under product Category XHEZ.
- B. Gypsum Board Wall Penetrations:
 1. Blank Opening: WL 0001-0999.
 2. Metallic Pipes: WL 1001-1999.
 3. Insulated Metallic Pipes: WL 5001-5999.
 4. Non-Metallic Pipes: WL 2001-2999.
 5. Sheet Metal Ducts: WL 7001-7999.
 6. Miscellaneous Electrical Items: WL 6001-6999.
 7. Cable Trays: WL 3001-3999.
- C. Gypsum Board Wall Terminations:
 1. Top of Wall to Concrete/Metal Deck: HWD 0001-0999.
- D. Wood Floor Penetrations:
 1. Blank Openings: FC 0001-0999.
 2. Metallic Pipes: FC 1001-1999.

3. Insulated Metal Pipes: FC 5001-5999.
4. Non-Metallic Pipes: FC 2001-2999.
5. Sheet Metal Ducts: FC 7001-7999.
6. Cable Trays: FC 3001-3999.

END OF SECTION

SECTION 079200
JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Silicone joint sealants including mildew resistant silicone joint sealants
- 2. Urethane joint sealants.
- 3. Latex joint sealants.
- 4. Acoustical joint sealants.
- 5. Joint sealant Backings

- B. Related Sections:

- 1. Division 04 Section "Concrete Unit Masonry" for masonry control and expansion joint fillers and gaskets.

1.3 SUBMITTALS

- A. Product Data: For each joint-sealant product, include documentation for VOC content of sealants and sealant primers.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Joint-Sealant Schedule: Include the following information:
 - 1. Joint-sealant application, joint location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.
- D. Field-Adhesion Test Reports: For each sealant application tested.
- E. Warranties: Sample of special warranties.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An entity employing installers trained and experienced in installing joint sealants similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance.
- B. Product Testing: Test joint sealants using a qualified testing agency.
 - 1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.
- C. Preinstallation Conference: Conduct conference at Project site.

1.5 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
 - 2. When joint substrates are wet.
 - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.6 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.
- C. Special warranties shall warrant that all exposed sealants will be guaranteed against any crazing developing on the surfaces of the material, any staining of adjacent surfaces by sealant or by primer (yellowing, etc.), chalking, or color changes on surface of cured sealant.
- D. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
2. Disintegration of joint substrates from causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. VOC Content: Sealants and primers applied at the Project site shall comply with VOC limits of authorities having jurisdiction; VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); and VOC limits of the California Green Building Standards Code (CGBSC), Section 5.504.4.1 and Table 504.4.2 as follows:
 1. Architectural Sealants: 250 g/L.
 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 3. Sealant Primers for Porous Substrates: 775 g/L.
- C. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- D. Stain-Test-Response Characteristics: Where sealants are indicated to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- E. Suitability for Contact with Food: Where sealants are used in areas of food preparation, use products that comply with 21 CFR 177.2600 and are USDA approved.
- F. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.
- G. Source Limitations: Obtain each kind of joint sealant from a single source from a single manufacturer.

2.2 SILICONE JOINT SEALANTS

- A. Silicone, S, NS, 100/50, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, non-traffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Use NT. neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dow Corning Corporation; 790.
 - b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
 - c. Tremco Incorporated; Spectrem 1.
 2. Joint Sealant Application: Exterior joints where one or both joint faces are masonry, stone, concrete or other porous materials.
- B. Silicone, Acid Curing, S, NS, 25, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant: ASTM C920, Type S, Grade NS, Class 25, Use NT.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dow Corning Corporation; 999-A.
 - b. GE Advanced Materials - Silicones; Contractors SCS1000.
 - c. Tremco Incorporated; Proglaze.
 2. Joint Sealant Application: Exterior joints where both joint faces are metal, glass, plastic, or other non-porous material.
- C. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT; formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dow Corning Corporation; 786 Mildew Resistant.
 - b. GE Advanced Materials - Silicones; Sanitary SCS1700.
 - c. Tremco Incorporated; Tremsil 200 Sanitary.
 2. Joint Sealant Application: Interior joints between plumbing fixtures and floor or wall surfaces of non-porous materials.

2.3 URETHANE JOINT SEALANTS

- A. Urethane, S, NS, 25, NT: Single-component, nonsag, nontraffic-use, plus 25 percent and minus 25 percent movement capability, urethane joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.
1. Products: Subject to compliance with requirements, provide one of the following:

- a. BASF Building Systems; Sonolastic NP1.
 - b. Pecora Corporation; Dynatrol I-XL.
 - c. Sika Corporation, Construction Products Division; Sikaflex - 1a.
 2. Joint Sealant Application: Exterior joints of hollow metal frames, exterior joints in concrete and masonry walls, and interior and exterior joints requiring painting.
- B. Urethane, S, P, 25, T, NT: Single-component, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade P, Class 25, Uses T and NT.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. BASF Building Systems; Sonolastic SL 1.
 - b. Pecora Corporation; Urexpan NR-201.
 - c. Sika Corporation. Construction Products Division; Sikaflex - 1CSL.
 2. Joint Sealant Application: Interior concrete slab floor joints and exterior paving joints.

2.4 LATEX JOINT SEALANTS

- A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. BASF Building Systems; Sonolac.
 - b. Pecora Corporation; AC-20+.
 - c. Tremco Incorporated; Tremflex 834.
 2. Joint Sealant Application: Interior non-moving joints between gypsum board and adjacent materials, trim, or similar surfaces.

2.5 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Joint Sealant: Manufacturer's standard non-sag, paintable, non-staining latex acoustical sealant complying with ASTM C 834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. GE Construction Sealants; RCS20 Acoustical.
 - b. Pecora Corporation; AC-20 FTR or AIS-919.
 - c. Tremco, Incorporated; Tremco Acoustical Sealant.
 - d. USG Corporation; SHEETROCK Acoustical Sealant.
 2. Joint Sealant Application: Interior joints of acoustically rated construction and where indicated on Drawings.

2.6 JOINT SEALANT BACKING

- A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) or Type B (bicellular material with a surface skin), as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.7 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective

coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

- a. Concrete.
- b. Masonry.
- c. Unglazed surfaces of ceramic tile.
- d. Exterior insulation and finish systems.

3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

- a. Metal.
- b. Glass.
- c. Porcelain enamel.
- d. Glazed surfaces of ceramic tile.

- B. Etch concrete and masonry joint surfaces as recommended by manufacturer to remove excess alkalinity, unless sealant manufacturer's printed instructions indicate that alkalinity does not interfere with sealant bond and performance. Etch with 5% solution of muriatic acid; neutralize with diluted ammonia solution, rinse thoroughly with water and allow to dry before sealant installation.
- C. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- D. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Install sealant to depths as shown or, if not shown, as recommended by sealant manufacturer but within the following general limitations, measured at center (thin) section of bead:
 - 1. For sidewalks, pavements and similar joints sealed with elastomeric sealants and subject to traffic and other abrasion and indentation exposures, fill joints to a depth equal to 75 percent of joint width, but neither more than 5/8 inch deep nor less than 3/8 inch deep.
 - 2. For normal moving joints sealed with elastomeric sealants but not subject to traffic, fill joints to a depth equal to 50 percent of joint width, but neither more than 1/2 inch deep nor less than 1/4 inch deep.
 - 3. For joints sealed with non-elastomeric sealants and caulking compounds, fill joints to a depth in range of 75 to 125 percent of joint width.
- G. Do not allow sealants or compounds to overflow or spill onto adjoining surfaces, or to migrate into voids of adjoining surfaces.
- H. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.

3.4 INSTALLATION OF ACOUSTICAL JOINT SEALANTS

- A. General: Comply with acoustical joint-sealant manufacturer's written installation instructions unless more stringent requirements apply.
- B. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical joint sealant. Install acoustical joint sealants at both faces of partitions, at perimeters, and through penetrations. Comply with ASTM C 919, ASTM C 1193, and manufacturer's written recommendations for closing off sound-flanking paths around or through assemblies, including sealing partitions to underside of floor slabs above acoustical ceilings.
- C. Acoustical Ceiling Areas: Apply acoustical joint sealant at perimeter edge moldings of acoustical ceiling areas in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

3.5 FIELD QUALITY CONTROL

- A. General: Provide field adhesion testing when required by manufacturer and/or installer for warranties required of manufacturer and/or installer.
- B. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
 - 1. Extent of Testing: Test completed and cured sealant joints as follows:
 - a. Perform 10 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.
 - b. Perform 1 test for each 1000 feet of joint length thereafter or 1 test per each floor per elevation.
 - 2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
 - a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 - 3. Inspect tested joints and report on the following:
 - a. Whether sealants filled joint cavities and are free of voids.
 - b. Whether sealant dimensions and configurations comply with specified requirements.
 - c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.

4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
 5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.
- C. Evaluation of Field-Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.6 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.7 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION

SECTION 092900
GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Interior gypsum board.
 - 2. Division 06 Section "Rough Carpentry" for wood framing and furring that supports gypsum board.
 - 3. Division 07 Section "Penetration Firestopping" for head-of-wall assemblies that incorporate gypsum board.
 - 4. Division 09 Section "Painting" for primers applied to gypsum board surfaces.

1.3 ACTION SUBMITTALS

- A. Product Data: Manufacturer's product data for each type of product indicated or incorporated into the Work.
 - 1. Include statement of VOC content for any adhesives or sealants.

1.4 DELIVERY, STORAGE, AND HANDLING

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

1.5 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install paper faced gypsum panels until installation areas are enclosed and conditioned.

- C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

2.2 GYPSUM BOARD PANELS, GENERAL

- A. Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.
 - 1. Width: 4 feet.
 - 2. Length: 8, 10, or 12 feet.

2.3 INTERIOR GYPSUM BOARD

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. American Gypsum Co.
 - 2. Georgia-Pacific Gypsum, LLC.
 - 3. Lafarge North America Inc.
 - 4. National Gypsum Company.
 - 5. PABCO Gypsum.
 - 6. USG Corporation.
- B. Interior Gypsum Wallboard: ASTM C 1396/C 1396M of the following types:
 - 1. Regular Type:
 - a. Thickness: 5/8 inch.
 - b. Long Edges: Tapered.
 - 2. Type X:
 - a. Thickness: 5/8 inch.
 - b. Long Edges: Tapered.

3. Moisture and Mold-Resistant Type: With moisture and mold-resistant core and surfaces.
 - a. Core: 5/8 inch, Type X.
 - b. Long Edges: Tapered.
 - c. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.4 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
 1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
 2. Shapes: As required for project conditions, including but not limited to the following:
 - a. Cornerbead.
 - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - c. L-Bead: L-shaped; exposed long flange receives joint compound.
 - d. U-Bead: J-shaped; exposed short flange does not receive joint compound.

2.5 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
 1. Interior Gypsum Board: Paper.
 2. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
 3. Fill Coat: For second coat, use drying-type, all-purpose compound.
 4. Finish Coat: For third coat, use drying-type, all-purpose compound.

2.6 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
- C. Acoustical Sealant: As specified in Division 07 Section "Joint Sealants."

1. Sealants shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

D. Insulation: As specified in Division 07 Section "Blanket Insulation."

2.7 TEXTURE FINISHES

A. Primer: As recommended by textured finish manufacturer.

1. Coordinate primers with Division 09 Section "Painting."

B. Aggregate Finish: Water-based, job-mixed, aggregated, drying-type texture finish for spray application.

1. Texture: Light spatter

C. Non-Aggregate Finish: Pre-mixed, vinyl texture finish for spray application.

1. Texture: Spatter

D. Where Work is adjacent to existing gypsum board surfaces, match existing texture.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLING ACOUSTICAL BOARD PANELS

- A. Install panels in accordance with manufacturer's written installation instructions.
- B. Locate ends and edges over framing members, blocking, or solid backing.
- C. Fasten panels to supports with screws.

3.3 APPLYING AND FINISHING GYPSUM PANELS, GENERAL

- A. Comply with ASTM C 840 and manufacturer's written installation instructions.

- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4 to 3/8-inch wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4 to 1/2-inch wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Fastening Gypsum Board Panels: Comply with fastening requirements of ASTM C 840 unless more stringent fastening requirements are required for fire resistance rated gypsum board assemblies as indicated on Drawings. Fasten gypsum panels to supports with steel drill screws as follows:
 - 1. Fastener Spacing, Single Layer Gypsum Board Application:
 - a. Ceilings: Space fasteners 12 inches on center maximum.
 - b. Walls: Space fasteners 12 inches on center maximum where studs are spaced 24 inches on center; fastener spacing may be increased to 16 inches on center where studs are spaced 16 inches on center.
 - c. Edge Distance: Space fasteners 3/8 inches minimum from panel edges.
 - 2. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
 - 3. Attachment to Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat

grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members, or provide control joints to counteract wood shrinkage.

4. Where gypsum panels are installed over structural sheathing or acoustical board panels, increase the length of fasteners an amount equal to not less than the thickness of the sheathing or panels.

I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

J. Coordinate gypsum panel installation with insulation work specified in Division 07 Section "Blanket Insulation."

1. Thermal and sound attenuation batt/blanket insulation shall be installed before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side of framing members.

3.4 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Type X: Unless otherwise indicated.
2. Regular Type: At vertical and horizontal surfaces, unless otherwise indicated.
3. Type X: Where required for fire-resistance-rated assemblies.
4. Moisture and Mold-Resistant Type: At walls of toilet and janitor rooms, walls within 2 feet (horizontally) of plumbing fixtures, and other locations as indicated on Drawings.
5. Flexible Type: Apply in double layer at curved assemblies.
6. Abuse-Resistant Type: At locations indicated on Drawings.
7. High-Impact Type: At locations indicated on Drawings.
8. Acoustically Enhanced Type: At locations indicated on Drawings.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing, unless otherwise indicated.
2. On partitions/walls, apply gypsum panels vertically (parallel to framing) using continuous panels without abutting end joints unless otherwise indicated or required by fire-resistance-rated design.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - b. At stairwells and other high walls where the vertical dimension of the wall without horizontal offsets exceeds the maximum available panel length,

install panels horizontally, unless otherwise indicated or required by fire-resistance-rated design.

3. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
4. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.

C. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints 1 framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers parallel to framing members, as required for single layer application, with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. Fastening Methods: Fasten base layers and face layers separately to supports with screws or as required for fire resistance rated design.

D. Curved Surfaces:

1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus not less than 12-inch long straight sections at ends of curves and tangent to them.
2. For double-layer construction, fasten base layer to studs with screws 16 inches on center. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches on center at framing members.

3.5 APPLYING TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and install at locations indicated to receive tile. Install with 1/4-inch gap where panels abut other construction or penetrations.
- B. Cementitious Backer Units: ANSI A108.11, at locations indicated to receive tile.
- C. Where tile backing panels abut other types of panels in same plane, provide panels of matching thickness or shim surfaces to produce a uniform plane across panel surfaces.

3.6 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

- B. Control Joints: Install control joints at locations indicated on Drawings and according to ASTM C 840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
 - 1. Cornerbead: Use at outside corners, unless otherwise indicated.
 - 2. LC-Bead: Use at exposed panel edges.
 - 3. L-Bead: Use at exposed panel edges where LC-Bead cannot be used.
 - 4. U-Bead: Use where indicated.
- D. Aluminum Trim: Install at locations indicated on Drawings.

3.7 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840 and the Gypsum Association:
 - 1. Level 1: All joints and interior angles shall have tape embedded in joint compound; surface shall be free of excess joint compound; tool marks and ridges are acceptable.
 - a. Locations: Concealed areas and areas above ceilings.
 - 2. Level 2: All joints and interior angles shall have tape embedded in joint compound and one separate coat of joint compound applied over all joints, angles, fastener heads, and accessories; surface shall be free of excess joint compound; tool marks and ridges are acceptable.
 - a. Locations: Panels that are substrate for applied rigid panels having a thickness not less than 3/8 inches.
 - 3. Level 3: All joints and interior angles shall have tape embedded in joint compound and two (2) separate coats of joint compound applied over all joints, angles, fastener heads, and accessories; all joint compound shall be smooth and free of tool marks and ridges.
 - a. Locations: Not used unless otherwise indicated on Drawings.
 - 4. Level 4: All joints and interior angles shall have tape embedded in joint compound and Three (3) separate coats of joint compound applied over all joints,

angles, fastener heads, and accessories; all joint compound shall be smooth and free of tool marks and ridges.

- a. Locations: At panel surfaces that will be exposed to view and painted or will be substrates for wall coverings.
 - b. Primer and its application to surfaces are specified in Division 09 Section "Painting."
 - c. Where suspended ceilings are to be installed, wall finish shall extend not less than 6 inches above the ceiling height.
5. Level 5: All joints and interior angles shall have tape embedded in joint compound and Three (3) separate coats of joint compound applied over all joints, angles, fastener heads, and accessories; a thin skim coat of joint compound or similar material specific for this purpose shall be applied to the entire surface; the surface shall be smooth and free of tool marks and ridges.
- a. Locations: Not used unless otherwise indicated on Drawings
 - b. Primer and its application to surfaces are specified in Division 09 Section "Painting."

E. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions.

F. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.8 APPLYING TEXTURE FINISHES

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

3.9 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

SECTION 099100
PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specifications Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes surface preparation and field painting, staining or refinishing of the following:
 - 1. Exposed exterior items and surfaces.
 - 2. Exposed interior items and surfaces.
 - 3. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.
- B. Related Sections include but are not limited to the following:
 - 1. Division 05 Sections for shop priming of metal substrates with primers specified in this Section.
 - 2. Division 06 Sections for shop priming carpentry with primers specified in this Section.
 - 3. Division 09 Section "Gypsum Board" for sealing gypsum board surfaces before application of surface textures with primers/sealers specified in this Section.
 - 4. Division 21 through 23 Sections for additional requirements for painting of plumbing and mechanical items.
 - 5. Division 26

1.3 SPECIAL REQUIREMENTS

- A. Unauthorized removal or disconnecting of electrical fixtures, switches, or control devices may result in additional electrical work to comply with energy regulations of governing agencies. Contractor shall be financially responsible with no additional cost to the Owner for additional electrical work due to unauthorized removal or disconnecting of electrical fixtures, switches, or control devices.

1.4 DEFINITIONS

- A. Definitions of gloss levels below are from "MPI Architectural Painting Specification Manual" (hereafter, "MPI Manual").

1. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
2. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
3. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
4. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
5. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
6. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.5 SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for each type of finish-coat material indicated.
- C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
 1. Submit Samples on 8 inch square samples of actual material to be painted or stained. For masonry surfaces, include a mortar joint.
 2. Step coats on Samples to show each coat required for system.
 3. Label each coat of each Sample.
 4. Label each Sample for location and application area.
- D. Product List: For each product indicated, include the following:
 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
 2. VOC content.
- E. Coating Maintenance Manual: Submit with Closeout/Maintenance Submittals a Coating Maintenance manual; manual shall include a floor plan with rooms identified by name and number, a finish schedule coordinated with the floor plan, designations of where each product/color/finish was used, product data pages, Material Safety Data Sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

1.6 QUALITY ASSURANCE

- A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to that indicated for this Project with a record of successful in-service performance.
- B. Source Limitations: Obtain block fillers, primers, and undercoat materials for each coating system from the same manufacturer as the finish coats.

- C. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify color selections and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.
 - b. Other Items: Architect will designate items or areas required.
 2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the Project Site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:
1. Product name or title of material.
 2. Product description (generic classification or binder type).
 3. Manufacturer's stock number and date of manufacture.
 4. Contents by volume, for pigment and vehicle constituents.
 5. Thinning instructions.
 6. Application instructions.
 7. Color name and number.
 8. VOC content.
- B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F.
1. Maintain containers used in storage in a clean condition, free of foreign materials and residue.
 2. Keep storage area neat and orderly. Remove oily rags and waste daily.
 3. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.

1.8 PROJECT CONDITIONS

- A. Apply paints only when the temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

- B. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
- C. Protection:
 - 1. Cover or otherwise protect finished work of other trades, work not to be painted concurrently, landscaping, and adjacent property from damage.
 - 2. When not in use, store paints in designated areas. Keep containers closed. At end of day's work, remove empty containers, paint soaked rags, and debris. Vent fumes. Take precautions to prevent fire.
- D. Sequencing, Scheduling:
 - 1. Coordinate removal and replacement of hardware, electrical fixtures and trim, and related work of other Sections.
 - 2. Stain, prime, back paint, and pre-finish items before installation as required.
- E. Cleaning and Disposal:
 - 1. Do not use Project plumbing fixtures or piping systems for:
 - a. Cleaning painting equipment and utensils.
 - b. Disposal of waste from cleaning or disposal of paints.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Scheduled Paint Systems: Provide paint systems as scheduled on the Drawings and listed in Part 3 Article "Paint Systems" to comply with requirements in this Section.
 - 1. Named Manufacturers' Products: Manufacturer and product designations indicated in the scheduled paint systems are for the purpose of establishing minimum requirements; unless otherwise indicated, paint products are based on products manufactured by the following:
 - a. Sherwin Williams Paints.
 - 1) Subject to compliance with requirements, provide the named products or comparable products by one of the following:
 - a) Dunn-Edwards Paints.
 - b) Glidden Professional.
 - c) PPG Paints.
 - d) Tnemec.

2.2 PAINT MATERIALS, GENERAL

- A. Material Compatibility: Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 1. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
- C. VOC Content: Paints and coatings applied at the Project site shall comply with VOC limits of authorities having jurisdiction; VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); and VOC limits of the California Green Building Standards Code (CGBSC), Section 5.504.4.3 and Table 504.4.3 as follows:
 - 1. Flat Paints and Coatings: VOC not more than 50 g/L.
 - 2. Nonflat Paints and Coatings: VOC not more than 100 g/L.
 - 3. Nonflat High-Gloss Paints and Coatings: VOC not more than 150 g/L.
 - 4. Dry-Fog Coatings: VOC not more than 150 g/L.
 - 5. Floor Coatings: VOC not more than 100 g/L.
 - 6. Pretreatment Wash Primers: VOC not more than 420 g/L.
 - 7. Primers, Sealers, and Undercoaters: VOC not more than 100 g/L.
 - 8. Rust Preventative Coatings Applied to Ferrous Metals: VOC not more than 250 g/L.
 - 9. Shellacs, Clear: VOC not more than 730 g/L.
 - 10. Shellacs, Pigmented: VOC not more than 550 g/L.
 - 11. Stains: VOC not more than 250 g/L.
 - 12. Clear Wood Finishes, Varnishes: VOC not more than 275 g/L.
 - 13. Clear Wood Finishes, Lacquers: VOC not more than 275 g/L.
 - 14. Zinc-Rich Industrial Maintenance Primers: VOC not more than 340 g/L.
- D. Low-Emitting Materials: Interior paints and coatings shall comply with the testing and product requirements of the California Department of Public Health' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- E. Colors: Provide color selections made by the Architect. Colors shall be factory mixed and match approved samples.

2.3 INTUMESCENT PAINTS

- A. Intumescent Paint: Water based latex post treatment interior fire retardant intumescent paint; non-toxic and mold resistant.
 - 1. Product: Flame Stop Inc.; Flame Stop IM.

2. Flame Spread: Zero (0) per ASTM E 84; 30 Minute Test Method of Test of Surface Burning Characteristics of Building Materials.
3. VOC Content: Not more than 50 g/L.
4. Applied Thickness: Two coats, each coat applied at a rate of 200 sf/gal.
5. Color and Gloss: As selected by Architect from manufacturer's full range.
6. Substrate Primers: Primers approved by intumescent paint manufacturer; use where manufacturer recommends use of a primer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 1. Concrete: 12 percent.
 2. Masonry (Clay and CMU): 12 percent.
 3. Wood: 15 percent.
 4. Portland Cement Plaster: 12 percent.
 5. Gypsum Board: 12 percent.
- C. Portland Cement Plaster Substrates: Verify that plaster is fully cured.
- D. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- E. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- F. Proceed with coating application only after unsatisfactory conditions have been corrected.
 1. Application of coating indicates acceptance of surfaces and conditions.
- G. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
 1. Notify the Architect of anticipated problems using the materials specified over substrates primed by others.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.

- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. Electrical Items: Remove only switch and outlet cover plates and similar items that do not require disconnecting wiring. Do not disconnect wiring or remove electrical fixtures, switches, or control devices unless otherwise indicated on Electrical Drawings.
 - a. Contractor may be subject to additional costs due to unauthorized removal of items, refer to Part 1 Article "Special Requirements."
 - 2. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
 - 2. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- D. Concrete and Masonry Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Perform appropriate tests to determine alkalinity and moisture content of surfaces; testing shall be performed or witnessed by a certified representative of the paint manufacturer. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
 - 1. Cracks and defects at concrete and masonry surfaces shall be filled with cement grout; match surface texture.
 - 2. Clean concrete floors to be painted with a 5 percent solution of muriatic acid or other etching cleaner. Flush the floor with clean water to remove acid, neutralize with ammonia, rinse, allow to dry, and vacuum before painting.
- E. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:
 - 1. Steel Structures Painting Council's (SSPC), SSPC-SP 3, "Power Tool Cleaning."
 - 2. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."
- F. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

- H. Aluminum Substrates: Remove loose surface oxidation.
- I. Wood Substrates: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required.
 - 1. Scrape and clean knots. Before applying primer, apply coat of knot sealer recommended in writing by topcoat manufacturer for exterior use in paint system indicated.
 - 2. Sand surfaces that will be exposed to view, and dust off.
 - 3. Prime, stain, or seal wood to be painted immediately on delivery. Prime edges, ends, faces, undersides, and backsides of wood.
 - a. When transparent finish is required, backprime with spar varnish.
 - b. Backprime paneling on interior partitions where masonry, plaster, or other wet wall construction occurs on backside.
 - c. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.
 - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- J. Plastic Trim Fabrication Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.
- K. Materials Preparation: Mix and prepare paint materials according to manufacturer's written instructions.
 - 1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
 - 2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
 - 3. Use only thinners approved by paint manufacturer and only within recommended limits.
- L. Drywall: Fill any cracks or defects with drywall joint compound. Sand any rough spots smooth. Do not raise nap on paper covering.

3.3 APPLICATION

- A. General: Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual." Paint/stain exposed surfaces, except where schedules indicate that a surface or material is not to be painted/stained or is to remain natural. If schedules do not specifically mention an item or surface to be painted, paint the item or surface the same as similar adjacent materials or surfaces whether or not schedules indicate colors. If the schedules do not indicate color or finish, the Architect will select from standard colors and finishes available.
 - 1. Use applicators and techniques suited for paint and substrate indicated.

2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
 3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
 4. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
 7. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
 8. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convactor covers, covers for finned-tube radiation, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.
 9. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
 - a. Prefinished items include the following factory-finished components:
 - 1) Aluminum storefronts and entrances.
 - 2) Anodized aluminum gypsum board and plaster trim.
 - 3) Acoustical wall panels.
 - 4) Toilet and urinal partitions.
 - 5) Stainless steel items.
 - 6) Finished mechanical and electrical equipment.
 - 7) Light fixtures.
 - 8) Distribution cabinets.
 - b. Labels: Do not paint over Underwriters Laboratories (UL), Factory Mutual (FM), or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.
- B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. The number of coats and the film thickness required are the same regardless of application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
 2. Omit primer on metal surfaces that have been shop primed and touchup painted.
 3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
 4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.
- F. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions and recommendations in "MPI Manual."
1. Brushes: Use brushes best suited for the type of material applied. Use brush of appropriate size for the surface or item being painted.
 2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.
 3. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.
- G. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.
- H. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.
- I. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or other defects due to insufficient sealing.
- J. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.
- K. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections.
1. Provide satin finish for final coats.

- L. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling, such as laps, irregularity in texture, skid marks, or other surface imperfections.
- M. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.
- N. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work: Paint the following work where exposed to view at applications indicated:
 - 1. Equipment rooms:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Ducts, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - 2. Occupied areas:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Ducts, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - h. Interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
 - i. Other items as directed by Architect.
 - 3. Exterior locations:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.

3.4 CLEANING AND PROTECTION

- A. At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from the site.

- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.
- E. Correction of Defective Work:
 - 1. Repair abraded, damaged or incomplete paint surfaces by methods acceptable to Architect. Spot repairs to be well-blended into adjacent work. For large repairs, re-coat entire plane or building element in which damaged area occurs.
 - 2. Defaced surfaces of work not to be painted shall be cleaned and their original finish restored.
- F. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 PAINT SYSTEMS

(Interior and exterior paint systems are on the following pages)

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A. Interior Paint Systems:

SURFACE		PAINT SYSTEM		COATS	MANUFACTURER'S DESIGNATION	
(1)	Gypsum Drywall	P12.A	Flat, Latex	First Coat Second Coat Third Coat	B28 B30 B30	ProMar 200 Zero Primer ProMar 200 Zero Flat ProMar 200 Zero Flat
		P12.B	Semi-Gloss Latex	First Coat Second Coat Third Coat	B28 B31 B31	ProMar 200 Zero Primer ProMar 200 Zero SG ProMar 200 Zero SG
		P12.C	Eggshell Enamel Latex	First Coat Second Coat Third Coat	061 B20 B20	ProMar 200 Zero Primer ProMar 200 Zero EG ProMar 200 Zero EG
	(Textured)	P12.D	Flat	One Coat	A44	Tuff Surface
(2)	Wood	P13.A	Semi-Gloss Latex	First Coat Second Coat Third Coat	B28 B31 B31	Premium Wall & Wood ProMar 200 Zero SG ProMar 200 Zero SG
		P13.B	Eggshell Enamel, Latex	First Coat Second Coat Third Coat	168 A75 A75	Premium Wall & Wood Solo EG Solo EG
		P13.C	Lacquer Velvet	Stain First Coat Second Coat Third Coat	15700 27520 27520	Minwax 250 Sanding Sealer High Solids Velvet Lacquer High Solids Velvet Lacquer
		P13.D	Lacquer Semi-Gloss	Stain First Coat Second Coat Third Coat	15700 27540 27590	Minwax 250 Sanding sealer High Solids S.G. Lacquer High Solids S.G. Lacquer
		P13.E	Lacquer Gloss	Stain First Coat Second Coat Third Coat	15700 27590 27590	Minwax 250 Sanding Sealer High Solids Gloss Lacquer High Solids Gloss Lacquer
		P13.F	Varnish Velvet	Stain First Coat Second Coat Third Coat	A68 A68 A68	Minwax 250 Wood Classics Wood Classics Wood Classics
		P13.G	Varnish Semi-Gloss	Stain First Coat Second Coat Third Coat	A68 A68 A68	Minwax 250 Wood Classics Wood Classics Wood Classics
(2A)	Telecom Plywood Backboard	P13.H	Intumescent Paint	Primer First Coat Second Coat	 	(Primer if req. by intumescent paint mfr) Flame Stop IM Flame Stop IM

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SURFACE		PAINT SYSTEM		COATS	MANUFACTURER'S DESIGNATION	
(3)	Ferrous Metal	P14.A	Flat Latex	First Coat Second Coat Third Coat	B66310 A74 A74	ProCryl Metal Primer Solo Flat SoloFlat
		P14.B	Semi-Gloss Latex	First Coat Second Coat Third Coat	B66310 A76 A76	ProCryl Metal Primer Solo SG Solo SG
	Ferrous Metal (Cont.)	P14.C	Eggshell Latex	First Coat Second Coat Third Coat	B66310 A75 A75	ProCryl Metal Primer Solo EG Solo EG
(4)	Galvanize d Metal/ Aluminum	P15.A	Flat Latex	First Coat Second Coat Third Coat	B66310 A74 A74	ProCryl Metal Primer Solo Flat Solo Flat
		P15.B	Semi-Gloss Latex	First Coat Second Coat Third Coat	B66310 A76 A76	ProCryl Metal Primer Solo SG Solo SG
		P15.C	Eggshell Latex	First Coat Second Coat Third Coat	B66310 A75 A75	ProCryl Metal Primer Solo EG Solo EG
(5)	Plaster, Concrete, Brick	P16.A	Flat Latex	First Coat Second Coat Third Coat	LX02 B30 B30	Loxon ProMar 200 Zero Flat ProMar 200 ZeroFlat
		P16.B	Semi-Gloss Latex	First Coat Second Coat Third Coat	LX02 B31 B31	Loxon ProMar 200 Zero SG ProMar 200 Zero SG
		P16.C	Eggshell Latex	First Coat Second Coat Third Coat	LX02 B20 B20	Loxon ProMar 200 Zero EG ProMar 200 Zero EG
(6)	Concrete Block	P17.A	Flat latex	First Coat Second Coat Third Coat	B25 B30 B30	PrepRite Block Filler ProMar 200 Zero Flat ProMar 200 Zero Flat
		P17.B	Semi-Gloss Latex	First Coat Second Coat Third Coat	B25 B31 B31	PrepRite Block Filler ProMar 200 Zero SG ProMar 200 Zero SG
		P17.C	Eggshell Latex	First Coat Second Coat Third Coat	B25 B20 B20	PrepRite Block Filler ProMar 200 Zero ProMar 200 Zero
(7)	Acoustical Ceiling Tile/ Plaster	P18.A	Latex	One Coat to Cover	A21	EcoSelect
(8)	Ceramic Tile like Finishes	P19.A	Epoxy	First Coat Second Coat Third Coat	B51 B73 B73	Multi Purpose Primer PI Waterbased Epoxy PI Waterbased Epoxy

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SURFACE		PAINT SYSTEM		COATS	MANUFACTURER'S DESIGNATION	
(9)	Ceiling and Wall w/ misc. Pipes & Conduit Exposed, Trusses & Beams w/Spray-on Fire Insulation	P20.A	Latext Dry Fall	One Coat	B42	PI Waterbased Dryfall White or Black

(Exterior Paint Systems start on the following page)

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B. Exterior Paint Systems:

SURFACE		PAINT SYSTEM		COATS	MANUFACTURER'S DESIGNATION	
(1)	Plaster, Concrete	P50.A	Flat, Acrylic	First Coat Second Coat Third Coat	LX02 A6 A6	Loxon A-100 A-100
		P50.B	Low Sheen Enamel Acrylic	First Coat Second Coat Third Coat	LX02 126 126	Loxon A-100 A-100
		P50.C	Elastomeric (Smooth) 5 year labor warranty	First Coat Second Coat Third Coat (Spray App.)	LX02 CF12 CF12	Loxon Masonry Primer Conflex XL Conflex XL
		P50.D	Elastomeric (Medium Aggregate) 5 year labor warranty	First Coat Second Coat Third Coat	LX02 CF12 CF12	Loxon Masonry Primer Conflex XL Conflex XL
(2)	Concrete Block Masonry	P51.A	Flat, acrylic emulsion	First Coat Second Coat Third Coat	B25 A6 A6	PrepRite Block Filler A-100 A-100
		P51.B	Elastomeric Smooth 5 year labor warranty	First Coat Second Coat Third Coat	LX02 CF12 CF12	Loxon Masonry Primer Conflex XL Conflex XL
		P51.C	Elastomeric (Medium Aggregate) 5 year labor warranty	First Coat Second Coat Third Coat	LX02 CF12 CF12	Loxon Masonry Primer Conflex XL Conflex XL
		P51.D	Elastomeric (Coarse Aggregate)	First Coat Second Coat Third Coat	LX02 CF12 CF12	Loxon Masonry Primer Conflex XL Conflex XL
		P51.E	Clear Water Repellent 10 year Warranty	1 Coat	LX31	Loxon 40% Water Repellant (A31T40)
(3)	Wood	P53.A	Flat Acrylic Emulsion	First Coat Second Coat Third Coat	B42 A6 A6	Exterior Wood Primer A-100 A-100
		P53.B	Semi-Gloss Acrylic	First Coat Second Coat Third Coat	B42 A76 A76	Exterior Wood Primer Solo SG Solo SG
		P53.C	Low Sheen Enamel Acrylic	First Coat Second Coat Third Coat	B42 A75 A75	Exterior Wood Primer Solo LS Solo LS

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SURFACE		PAINT SYSTEM		COATS	MANUFACTURER'S DESIGNATION	
(3) (Cont.)	Wood	P53.D	Flat, Stain, Water Base, Semi-Transp.	First Coat Second Coat	A15T A15T	Decksapes ST Stain Decksapes ST Stain (A15T00215)
		P53.E	Flat, Stain Opaque	First Coat Second Coat	A6 A6	A100 A100
		P53.F	Varnish Clear Gloss	First Coat Second Coat Third Coat	6509 6509 6509	McCloskey's Spar McCloskey's Spar McCloskey's Spar
		P53.G	Stain and Varnish	First Coat Second Coat Third Coat	6509 6509	Aqua Seal McCloskey's McCloskey's
(4)	Ferrous Metal	P55.D	Gloss, High Perform.	First Coat Second Coat Third Coat	646 B65 B65	Macropoxy Epoxy Acrolon 100 Acrolon 100
		P55.E	Semi-Gloss High Perform.	First Coat Second Coat Third Coat	B66- 310 B66 B66	ProCryl Primer Pro Ind DTM Acrylic Pro Ind DTM Acrylic
(5)	Galv. Metal & Aluminum	P56.A	Gloss	First Coat	B66- 310	ProCryl Primer
				Second Coat Third Coat	A77 A77	Solo GL Solo GL
		P56.B	Flat, Acrylic	First Coat	B66- 310	ProCryl Primer
				Second Coat Third Coat	A74 A74	Solo Flat Solo Flat
		P56.C	Semi-Gloss Enamel Acrylic	First Coat Second Coat Third Coat	B66- 310 B53 B53	ProCryl Primer PI WB Urethan Enamel PI WB Urethan Enamel
(6)	Galv. Metal & Aluminum High Perf.	P57.C	Gloss High Perform.	First Coat Second Coat Third Coat	646 B65 B65	Marcopoxy Epoxy Acrolon 100 High Gloss Acrolon 100 High Gloss
				First Coat Second Coat Third Coat	B71Y1 B66 B66	DTM Wash Primer Pro Ind DTM Acrylic Pro Ind DTM Acrylic

END OF SECTION

SECTION 220000
GENERAL PLUMBING

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. This division requires the furnishing and installation of items specified or indicated on the drawing or reasonably inferred there from, including every article, device or accessory necessary to facilitate each system's functioning as a complete and lawful system.
- B. General Requirements, Division 01 of the Specifications, pertains to and is hereby made a part of Divisions 22 and 23. Contractor is to review the conditions and requirements of Division 1, including Sections on submittals and job site conditions and procedures.
- C. Electrical power and control wiring 50 volts and greater, motor starters, and disconnects are included in FACILITY SERVICES SUBGROUP, unless otherwise noted.

1.2 SCOPE OF WORK:

- A. This work shall consist of, but not be limited to, the following: Furnish and install plumbing fixtures and piping as shown for a complete and functioning system; and furnish and install chiller, boilers, unit ventilators, fans, controls, ductwork, grilles, flex duct and dampers as shown for a complete and functioning system. Prior to fabrication of ductwork, contractor shall verify clearances to determine if structural or other trades have infringed on the space allotted for mechanical equipment. If interferences occur, notify the General Contractor, District and the Architect or Mechanical Engineer.

1.3 FEES AND PERMITS:

- A. The contractor shall secure all permits, licenses, and inspections required for this work as outlined in Division 01.

1.4 CODES AND REGULATIONS:

- A. All work and materials shall be in accordance with the following codes as adopted and amended by the authority having jurisdiction. Nothing in these drawings or specifications is to be construed to permit work not conforming to these codes. Should the drawings or specifications call for material or methods of construction of a higher quality or standard than required by these codes, the specifications shall govern.
 - 1. California Code of Regulations:
 - a. Title 8, Industrial Relations.
 - b. Title 19, Public Safety.
 - c. Title 20, Building Standards.

- d. Title 24, Building Standards.
- 2. California Building Code.
- 3. California Mechanical Code.
- 4. California Plumbing Code.
- 5. Standards and regulations of other agencies or organizations, as listed in this specification relating to products or procedures. For example, American National Standards Institute, American Society for Testing and Materials, American Society of Mechanical Engineers, etc.

1.5 GUARANTEE:

- A. Guarantee shall be in accordance with the General Conditions. These specifications may extend the period of guarantee for certain items. Where such extensions are called for, or where items are normally provided with guarantee periods in excess of that called for in the General Conditions, the certificate of guarantee shall be furnished to District per Specification Section – GUARANTEES.

1.6 DRAWINGS:

- A. Layout of equipment and systems is generally diagrammatic, unless specifically dimensioned. Drawings shall be checked for interferences with structural or other conditions before installing work. Interferences shall be called to the attention of the District.

1.7 DEFINITIONS:

- A. Piping: The term piping shall mean all pipe, fittings, valves, insulation and accessories as required for a complete piping system.
- B. Agencies and Organizations:
 - 1. AABC - Associated Air Balance Council
 - 2. AAR - Association of American Railroads
 - 3. AGA - American Gas Association
 - 4. AMCA - American Moving and Conditioning Association
 - 5. ANSI - American National Standards Institute
 - 6. ARI - Air Conditioning and Refrigeration Institute
 - 7. ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers.
 - 8. ASME - American Society of Mechanical Engineers
 - 9. ASTM - American Society for Testing and Materials
 - 10. AWWA - American Water Works Association
 - 11. AAPMO - International Association of Plumbing and Mechanical Officials
 - 12. NEMA - National Electrical Manufacturers' Association
 - 13. NEBB - National Environmental Balancing Bureau
 - 14. NFPA - National Fire Protection Association
 - 15. SMACNA - Sheet Metal and Air Conditioning Contractors National Association
 - 16. UL - Underwriters' Laboratories

PART 2 - PRODUCTS:

2.1 QUALITY STANDARDS OF MATERIALS:

- A. The listing of product manufacturers in the various sections of the specifications and drawings is intended to establish a standard of quality only. It is not the intent of the Engineer to discriminate against any material or product that is equivalent, in the opinion of the Engineer, to the standards as described in the specifications and drawings, nor is it intended to preclude open competitive bidding.
- B. Products by other manufacturers will be accepted as outlined in Division 1, Specification Section - SUBSTITUTIONS. No products will be reviewed less than 10 days prior to bid date.
- C. The contractor shall submit to the District copies of complete lists of materials proposed for use, giving manufacturer's name and catalog numbers. Complete shop drawings shall follow for all equipment and fixtures. Shop drawings shall include dimensions, capacities, performance curves and other characteristics as listed in product specifications. Material or equipment shall not be ordered until a written reply is received from the District indicating review and approval of the submittals.

PART 3 - EXECUTION

3.1 TESTING AND START-UP:

- A. Refer to Division 01, and individual sections, for requirements for clean-up, testing, balancing and start-up.
- B. The HVAC system shall be balanced by a contractor licensed by a nationally recognized air balance certification agency to the satisfaction of the District's representative per Specification Section
– TESTING, ADJUSTING AND BALANCING.
- C. The piping systems shall be tested in accordance with the California Plumbing Code. Domestic hot and cold water piping shall be tested at 100 psig air pressure for a period of 2 hours. Gas piping shall be tested at 60 PSIG air pressure for a period of 1 hour. Sewer piping shall be tested with a water column to the height of the highest vent line. There shall be no detectable drop in pressure during the test, except that associated with temperature change. The gauge used shall have a least count of 1 PSIG and a range not greater than 150% of the testing pressure.
- D. Maintenance and operations manuals shall be provided at the conclusion to the project. They are to be loose-leaf vinyl covered binders with the project name displayed on the spine of the book in 1/2" high letters. Indexed tabs shall identify the individual sections. The manuals shall include installation, repair manuals provided by the equipment manufacturers, parts lists, listing of local supplier which carries replacement parts, wiring and control diagrams, air balance report, and other pertinent data. Copies shall be delivered to the

Engineer for review prior to submission to the District as outlined in Division 1.

- E. Verbal: The Contractor shall also verbally instruct the District's maintenance staff in the operation and maintenance of all equipment and systems.

3.2 WORKMANSHIP:

- A. All work done under this Division shall be the highest quality for the trade. Ductwork and piping shall be parallel to building lines. Exposed work shall be properly finished to reflect pride in workmanship.

3.3 SITE VISITATION:

- A. Prior to bidding this project, the contractor shall visit the site and become familiar with the site conditions. The contractor shall verify the work to be performed. Failure to visit the site will not be accepted as an excuse for extra compensation for visible obstacles.

END OF SECTION

SECTION 221000
PLUMBING PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Pipe and pipe fittings
 - 2. Valves
 - 3. Sanitary sewer piping system
 - 4. Domestic water piping system
 - 5. Natural gas piping system
 - 6. Condensate drain system
 - 7. Roof drains and downspouts
- B. Related Sections:
 - 1. Specification Section – GAS DISTRIBUTION SYSTEM.
 - 2. Specification Section – SANITARY SEWER SYSTEM.
 - 3. Specification Section – EARTHWORK.
 - 4. Specification Section – EXCAVATING, BACKFILLING, AND COMPACTION FOR UTILITIES.

1.2 REFERENCES

- A. Applicable Standards - The following standards are referenced herein:
 - 1. ANSI/ASME B16.3 - Malleable Iron Threaded Fittings Class 150 NS 300
 - 2. ANSI/ASME Sec. 9 - Welding and Brazing Qualifications
 - 3. ANSI/ASTM B32 - Solder Metal
 - 4. ANSI/ASTM D2466 - Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40
 - 5. ANSI/AWS DI.1 - Structural Welding Code.
 - 6. ASME - Boiler and Pressure Vessel Code.
 - 7. ASTM A53 - Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless.
 - 8. ASTM A74 - Cast Iron Soil Pipe and Fittings.
 - 9. ASTM A120 - Pipe, Steel, Black and Hot-Dipped Zinc Coated (Galvanized), Welded and Seamless, for Ordinary Uses.
 - 10. ASTM B88 - Seamless Copper Water Tube.
 - 11. ASTM C564 - Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
 - 12. ASTM D1785 - Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
 - 13. ASTM D2241 - Poly (Vinyl Chloride) (PVC) Plastic Pipe (SDR-PR).
 - 14. ASTM D2513 - Thermoplastic Gas Pressure Pipe, Tubing and Fittings.
 - 15. ASTM D2683 - Socket-Type Polyethylene Fillings for Outside Diameter-Controlled Polyethylene Pipe.
 - 16. ASTM D2729 - Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

17. ASTM D2855 - Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
18. ASTM D3033 - Type PSP Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
19. ASTM D3034 - Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and fittings.
20. ASTM F477 - Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
21. AWS A5.8 - Brazing Filler Metal.
22. AWWA C601 - Standard Methods for the Examination of Water and Waste Water.
23. CISPI 301 - Cast Iron Soil Pipe and Fittings for Hubless Cast Iron Sanitary Systems.

1.3 SUBMITTALS

- A. General - Submit listed submittals in accordance with Fresno Unified School District's General Requirements, Specification Section - SUBMITTAL PROCEDURES.
- B. Product Data – Submit product data including manufacturer's specifications and general recommendations for pipe materials, pipe fittings, valves, and accessories.

1.4 QUALITY ASSURANCE

- A. Valves: Manufacturer's name and pressure rating marked on valve body. Valves shall be manufactured in the USA.
- B. Welding Materials and Procedures: Conform to ASME Code and applicable state labor regulations.
- C. Welders Certification: In accordance with ANSI/ASME Sec 9, ANSI/AWS D1.1.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver material to job-site in new, dry, unopened, and well-marked containers showing product and manufacturer's name. Deliver material in sufficient quantity to allow continuity of work. Deliver and store valves in shipping containers with labeling in place.
- B. Storage: No material may be stored uncovered in the open or in contact with the ground.
- C. Handling: Material handling equipment shall be selected and operated so as not to damage equipment or existing construction. Handle material to prevent damage during transportation and installation.
- D. The Contractor shall assume full responsibility for the protection and safekeeping of products stored on premises.

PART 2 - PRODUCTS

2.1 SANITARY AND STORM SEWER PIPING

A. Buried beyond 5 feet of Building:

1. Cast Iron Pipe: ASTM A74, service weight. Fittings: Cast iron. Joints: ASTM C564, neoprene gasketing system or lead and oakum.
2. Changes of direction of sanitary/storm drainage and vent piping shall be by the appropriate use of approved fittings and shall be of angles presented by a 1/16 bend, 1/8 bend, 1/6 bend, combination wye and 1/8 bend, or drainage sweep.

B. Buried within 5 feet of Building:

1. Cast Iron Pipe: ASTM A74 service weight. Fittings: Cast iron. Joints: Hub-and-spigot, CISPI HSN compression type with ASTM C564 neoprene gaskets.
2. Cast Iron Pipe: CISPI 301, hubless, service weight. Fittings: Cast iron. Joints: Neoprene gaskets and stainless steel clamp- and-shield assemblies.
3. Changes of direction of sanitary/storm drainage and vent piping shall be by the appropriate use of approved fittings and shall be of angles presented by a 1/16 bend, 1/8 bend, 1/6 bend, combination wye and 1/8 bend, or drainage sweep.

C. Above Grade:

1. Cast Iron Pipe: ASTM A74, service weight. Fittings: Cast iron. Joints: Hub-and-spigot, CISPI HSN compression type with ASTM C564 neoprene gaskets.
2. Cast Iron Pipe: CISPI 301, hubless, service weight. Fittings: Cast iron. Joints: Neoprene gaskets and stainless steel clamp- and-shield assemblies.
3. Changes of direction of sanitary/storm drainage piping shall be by the appropriate use of approved fittings and shall be of angles presented by a 1/16 bend, 1/8 bend, 1/6 bend, combination wye and 1/8 bend, or drainage sweep.

2.2 WATER PIPING

A. Buried beyond 5 feet of Building:

1. Galvanized Steel Pipe: ASTM A53 or A120, Schedule 40. Fittings: Cast iron. Joints: Threaded galvanized malleable fittings. Covering: 40 mil polyethylene similar to "X-Tru-Coat".
2. Copper tubing: ASTM B88, Type K, hard drawn. Fittings: ANSI/ASME B16.29, wrought copper. Joints: AWS A5.8, BCuP silver braze.
3. PVC Pipe: Schedule 80, AWWA C900 – ASTM D1785, ASTM D2241, Fittings: ASTM D2464, ASTM D 2466, ASTM D 2467, ASTM F1970.

B. Buried within 5 feet of Building:

1. Galvanized Steel Pipe: ASTM A53 or A120, Schedule 40. Fittings: Cast iron. Joint Threaded galvanized malleable fittings. Covering: 40 mil polyethylene similar to "X-Tru-Coat."
2. Copper Tubing: ASTM B88, Type K. Fittings: ANSI/ASME B16.29, wrought copper. Joints: AWS A5.8, BCuP silver braze.

2.3 WATER PIPING AND CONDENSATE DRAINS

- A. Above Grade:
 - 1. Copper Tubing: ASTM B88, Type L. Fittings: ANSI/ASME B16.23, cast brass, or ANSI/ASME B16.29, wrought copper. Joints: AWS A5.8, BCuP silver braze.
 - 2. Galvanized Steel Pipe: ASTM A53 or A120, Schedule 40. Fittings: Cast iron. Joints: Threaded galvanized malleable fittings.
 - 3. PVC Pipe-Condensate drains are not allowed. Condensate drains shall be copper or steel as defined in Paragraphs 1 and 2 above.
 - 4. PVC Schedule 80 Pipe and Fitting: ASTM D1785, may be used on roofs.

2.4 NATURAL GAS PIPING

- A. Buried beyond 5 feet of Building:
 - 1. Steel Pipe: ASTM A53 or A120, Schedule 40 black. Fittings: ASTM A234, forged steel welding type, with ANSI/AWWA C105 polyethylene jacket equivalent to "X-TRU-COAT". Joints: ANSI/AWS D1.1, welded.
 - 2. Polyethylene Pipe: ASTM D2513, SDR 11.5. Fittings: ASTM D2683 or ASTM D2513 socket type. Joints: Fusion welded.
- B. Buried within five feet of Building:
 - 1. Steel Pipe: ASTM A53 or A120, Schedule 40 black. Fittings: ASTM A234, forged steel welding type, with ANSI/AWWA C105 polyethylene jacket equivalent to "X-TRU-Coat". Joints: ANSI/AWS D1.1, welded.
- C. Above Grade:
 - 1. Steel Pipe: ASTM A53 or A120, Schedule 40 black. Fittings: ANSI/ASME B 16.3, malleable iron, or ASTM A234, forged steel welding type. Joints: Screwed for pipe two inches and under; ANSI/AWS D1.1, welded, for pipe over two inches.

2.5 FLANGES, UNIONS, AND COUPLINGS

- A. Pipe Size Two Inches and Under: 150 psig malleable iron unions for threaded ferrous piping; bronze unions for copper pipe, brazed joints.
- B. Pipe Size Over Two Inches: 150 psig forged steel slip-on flanges for ferrous piping; bronze flanges for copper piping; neoprene gaskets for gas service; 1/16-inch thick preformed neoprene bonded to fibrous material.
- C. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.6 VALVES

- A. Gate Valves:

1. Up to 2" Inches: Threaded or soldered, lead-free, bronze body, non-rising stem, malleable iron hand wheel w/ stainless steel nut. Nibco T-113 or equal.
 2. Over 2" Inches: Flanged, lead-free, ductile iron body, resilient wedge non-rising stem w/ 2" operating nut below grade or hand wheel above grade.
- B. Globe Valves:
1. Up to Two Inches: Bronze body, rising stem and handwheel, inside screw, renewable composition disc, screwed ends, with backseating capacity.
 2. Over Two Inches: Iron body, bronze trim, rising stem and handwheel, OS&Y, plug-type disc, flanged ends.
- C. Ball Valves:
1. Up to Two Inches: Bronze body, stainless steel ball, Teflon seats and stuffing box ring, lever handle and balancing stops, threaded ends with union.
 2. Over Two Inches: Cast steel body, chrome plated steel ball, Teflon seat and stuffing box seals, lever handle, flanged.
- D. Gas Cocks:
1. Up to Two Inches: Bronze body, bronze tapered plug. non-lubricated, Teflon packing, threaded ends.
 2. Over Two Inches: Cast iron body and plug, non-lubricated, tenon packing, flanged ends.
- E. Butterfly Valves:
1. Iron body, bronze disc, resilient replaceable seat for service to 180 degrees F, water or lug ends, 10-position lever handle.
- F. Relief Valves:
1. Bronze body, Teflon seat, steel stem and springs, automatic, direct pressure actuated, capacities ASME certified and labeled.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Site Visit – Examine areas and conditions under which work of this section shall be performed.

3.2 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

3.3 INSTALLATION

- A. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- B. Route piping in orderly manner and maintain gradient.
- C. Install piping to conserve building space and not interfere with use of space.
- D. Group piping whenever practical at common elevations.
- E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- F. Provide clearance for installation of insulation and access to valves and fittings.
- G. Provide access where valves and fittings are not exposed.
- H. Slope water piping and arrange to drain at low points.
- I. Establish elevations of budded piping outside the building to ensure not less than 2 1/2 ft. of cover, unless shown otherwise.
- J. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
- K. Prepare pipe, fittings, supports, and access doors not prefinished, ready for finish painting.
- L. Establish invert elevations, slopes for drainage to 1/4 inch per foot minimum. Maintain gradients. Notify Engineer if slope cannot be maintained.
- M. Excavate in accordance with Specification Sections in the Facility Construction Subgroup and for work of this Section.
- N. Backfill in accordance with Specification Sections in the Facility Construction Subgroup for work of this Section.
- O. Install bell and spigot pipe with bell end upstream.
- P. Install valves with stems upright or horizontal, not inverted.
- Q. Provide one-plug cock wrench for every 10 plug cocks sized two inches and smaller, minimum of one. Provide each plug cock sized 2-1, and larger with a wrench with set screw.
- R. Wrap gas pipe and fittings with a double layer of 10 mil Scotchwrap polyethylene tape with 50% overlap.

3.4 APPLICATION

- A. Install unions downstream of valves and at equipment or apparatus connections.
- B. Install brass male adapters each side of valves in copper piped system. Sweat solder adapters to pipe.
- C. Install gate, ball, or butterfly valves for shut-off and to isolate equipment, part of systems, or vertical risers.
- D. Install ball or butterfly valves for throttling, bypass, or manual flow control services.

3.5 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Prior to starting work, verify system is complete, flushed and clean.
- B. Ensure PH of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).
- C. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 mg/L residual.
- D. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.
- E. Maintain disinfectant in system for 24 hours.
- F. If final disinfectant residual tests less than 25 mg/L, repeat treatment.
- G. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.
- H. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C601.

3.6 SERVICE CONNECTIONS

- A. Connect to new services as shown on drawings.
- B. Provide new gas service complete with gas meter and regulators. Gas service distribution piping to have initial minimum pressure of 0.5 inch wg. Provide regulators on each line serving gravity type appliances, sized in accordance with equipment.

END OF SECTION

SECTION 231000
DUCTWORK

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. Low pressure ducts.
- B. Casings.
- C. Acoustic lining.
- D. Duct cleaning.

1.2 REFERENCES:

- A. ASHRAE - Handbook - Fundamentals; Duct Design.
- B. ASHRAE - Handbook - Equipment; Duct Construction.
- C. ASTM A 90 - Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles.
- D. ASTM A 525 - General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
- E. ASTM A 527 - Steel Sheet, Zinc-Coated (Galvanized) by Hot-Dip Process, Lock Forming Quality.
- F. NFPA 90A - Installation of Air Conditioning and Ventilating Systems.
- G. NFPA 90B - Installation of Warm Air Heating and Air Conditioning Systems.
- H. SMACNA - Low Pressure Duct Construction Standards.
- I. UL 181 - Factory-Made Air Ducts and Connectors.

1.3 DEFINITIONS:

- A. Duct Sizes: Inside clear dimensions. For lined ducts, maintain sizes inside lining.
- B. Low Pressure: Three pressure classifications: 1/2-inch WG positive or negative static pressure and velocities less than 2,000 fpm; 1-inch WG positive or negative static pressure and velocities less than 2,500 fpm and 2-inch WG positive or negative static pressure and velocities less than 2,500 fpm.
- C. Materials used in the construction of the ductwork, including linings and insulation shall have a flame spread rating of not more than 25 and a smoke developed rating of not more than 50.

1.4 REGULATORY REQUIREMENTS:

- A. Construct ductwork to Uniform Mechanical Code Standard 10-1 and NFPA 90A and NFPA 90B.
- B. Construct ductwork for Kitchen Exhaust Hood to NFPA 96 Standards and to California Mechanical Code Section 2022.

1.5 SUBMITTALS:

- A. Submit shop drawings and product data under provisions of Specification Section-SUBMITTALS.
- B. Indicate duct fittings, particulars such as gauges, sizes, welds, and configuration prior to start of work.
- C. Submit samples under provisions of Specification Section-SUBMITTALS.

1.6 DELIVERY, STORAGE AND HANDLING:

- A. Deliver material to jobsite in new, dry, unopened, and well-marked containers showing product and manufacturer's name.
- B. Material handling equipment shall be selected and operated so as not to damage equipment or existing construction.
- C. Deliver material in sufficient quantity to allow continuity of work.
- D. No material may be stored uncovered in the open or in contact with the ground.
- E. Handle material to prevent damage during transportation and installation.
- F. The Contractor shall assume full responsibility for the protection and safekeeping of products stored on premises.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. General: Non-combustible or conforming to requirements for Class 1 air duct materials, or UL 181.
- B. Steel Ducts: ASTM A525 or ASTM A. 27 galvanized steel sheet, lock-forming quality, having zinc coating of 1.25 oz. per sq. ft. for each side in conformance with ASTM A90.
- C. Fasteners: Rivets, bolts, or sheet metal screws.
- D. Sealant Non-hardening, water resistant, fire resistive, compatible with mating materials; liquid used alone or with tape, or heavy mastic.
- E. Hanger Rod: Steel, galvanized; threaded both ends, threaded one end, or continuously threaded.
- F. Factory-made Air Ducts shall be approved for the use intended or shall conform to the requirements of UMC Standard No. 10-1. Each portion of a factory-made air duct system shall be identified by the manufacturer with a label or other suitable identification indicating compliance with UMC Standard No. 10-1 and its class designation. These ducts shall be listed and shall be installed in accordance with the terms of their listing.

2.2 LOW PRESSURE DUCTWORK:

- A. Fabricate and support in accordance with SMACNA Low Pressure Duct Construction Standards and ASHRAE handbooks, except as indicated. Provide duct material, gauges, reinforcing, and sealing for operating pressures indicated.
- B. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE

table of equivalent rectangular and round ducts. No variation of duct configuration or sizes permitted, except by written permission.

- C. Construct Tee's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows are used, provide turning vanes. Where acoustical lining is indicated, provide fuming vanes of perforated metal with glass fiber insulation.
- D. Use double nuts and lock washers on threaded rod supports.

2.3 CASINGS:

- A. Fabricate casings in accordance with SMACNA Low Pressure Duct Construction Standards.

2.4 ACOUSTIC LINING:

- A. Glass fiber. Thermal conductivity shall not exceed 0.25 BTU- in/hr-ft²-degrees F at a mean temperature of 75-degree F. One side coated to prevent fiber erosion up to 6000 ft/min. Average noise reduction coefficient of 0.75. 1.5 lb/ft³ density. One-inch thickness. CSG Insulation Corp., Manville, Owens-Corning. Maximum flame spread 25, maximum smoke density 50.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- B. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

3.2 ADJUSTING AND CLEANING:

- A. Clean duct system and force air at high velocity through duct to remove accumulated dust. To obtain sufficient air, clean half the system at a time. Protect equipment, which may be harmed by excessive dirt with temporary filters, or bypass during cleaning.

END OF SECTION

232700
PIPING INSULATION

PART 1 - GENERAL

- I.01 WORK INCLUDED:
- A. Piping insulation.
 - B. Jackets and accessories.
 - C. No asbestos allowed.
- 1.02 REFERENCES:
- A. Insulation shall comply with California Title 24, Energy Conservation Standards.
- 1.03 QUALITY ASSURANCE:
- A. Applicator Company specializing in piping insulation application with three years minimum experience.
 - B. Materials: Flame spread/fuel contributed/smoke developed rating of 25/50/50 in accordance with ASTM E84, NAPA 255, UL 723.
- 1.04 SUBMITTALS:
- A. Submit product data under provisions of Section 01300.
 - B. Include product description, list of materials and thickness for each service, and locations.
 - C. Submit manufacturer's installation instructions under provisions of Section 01300.

PART 2 - PRODUCTS

- 2.01 ACCEPTABLE MANUFACTURERS:
- A. Knauf.
 - B. Certainteed.
 - C. Armstrong.
 - D. Substitutions: Under provisions of Section 01630.
- 2.02 FIBERGLASS INSULATION:
- A. Glass fiber insulation; ANSI/ASTM C 47; 'k' value of 0.24 at 75 degrees F; noncombustible. Preformed with all service jacket.
- 2.03 FOAM INSULATION:
- A. Cellular foam; flexible, plastic; 'k' value of 0.28 at 75 degrees F. Armaflex FR or equivalent For 3/4" and smaller pipes or refrigerant piping.
- 2.04 JACKETS:
- A. Interior Applications:
 - 1. Vapor Barrier Jackets: Kraft reinforced foil vapor barrier with self-sealing adhesive joints.
 - 2. PVC Jackets: One-piece, premolded type. Comply with Paragraph 1.03, B.
 - B. Exterior Applications:
 - 1. Aluminum Jackets: ASTM B209; 0.020 inch; smooth finish.

2. Stainless Steel Jackets: Type 304 stainless steel; 0.010 inch thick; smooth finish.
3. Cellular foam insulation to have manufacturer's approved coating for UV protection.

2.05 ACCESSORIES:

- A. Insulation Bands: 3/4-inch wide; 0.015-inch thick stainless steel, or 0.007-inch thick aluminum depending on jacket.
- B. Metal Jacket Bands: 3/8-inch wide; 0.015-inch thick aluminum. 0.010-inch thick stainless steel.
- C. Insulating Cement: ANSI/ASTM C195; hydraulic setting mineral wool.
- D. Adhesives: Compatible with insulation.

PART 3 - EXECUTION

3.01 PREPARATION:

- A. Install materials after piping has been tested and approved.

3.02 INSTALLATION:

- A. Install materials in accordance with manufacturer's instructions.
- B. Continue insulation with vapor barrier through penetrations.
- C. In exposed piping, locate insulation and cover seams in least visible locations.
- D. On insulated piping with vapor barrier, insulate fittings, valves, unions, flanges, strainers, flexible connections, and expansion joints.
- E. On insulated piping without vapor barrier and piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation at such locations.
- F. Provide an insert, not less than six inches long, of same thickness and contour as adjoining insulation, between support shield and piping, but under the finish jacket, on piping two inches diameter or larger, to prevent insulation from sagging at support points. Inserts shall be cork or other heavy density insulating material suitable for the planned temperature range. Kin-Line 463 or 466 insulation rings.
- G. Neatly finish insulation at supports, protrusions, and interruptions.
- H. Jackets:
 1. Indoor, Concealed Applications: Insulated pipes conveying fluids above ambient temperature shall have standard jackets. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. All service or PVC jackets may be used.
 2. Indoor, Concealed Applications: Insulated dual-temperature pipes or pipes conveying fluids below ambient temperature shall have vapor barrier jackets. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. All service or PVC jackets may be used.
 3. Indoor, Exposed Applications: For pipe exposed in mechanical equipment rooms or in finished spaces, insulate as for concealed applications. Provide PVC or metal jackets unless metal jacket is specifically required.
 4. Exterior Applications: Provide vapor barrier jackets. Cover with aluminum or stainless steel jacket with seams located on bottom side of horizontal piping. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Caulk with silicone (clear or silver) at all joints.

5. Buried Piping: Provide factory fabricated assembly with PVC pipe jacket and foam insulation (equivalent to PermaPipe).

3.03 SCHEDULE:

- A. Comply with California Title 24 Energy Conservation Standards as minimum.
- B. Provide 1" minimum on domestic hot water. Insulate cold water line to water heater per Code.
- C. Provide 1 1/2" minimum for chilled or heating hot water mains and 1" on branches.
- D. Provide 1/2" on all cold water exposed to exterior.

END OF SECTION

233300
DUCTWORK ACCESSORIES

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. Volume control dampers.
- B. Fire dampers.
- C. Backdraft dampers.
- D. Air turning devices.
- E. Flexible duct connections.
- F. Duct access doors.
- G. Duct test holes.

1.02 REFERENCES:

- A. NFPA 90A - Installation of Air Conditioning and Ventilating Systems.
- B. SMACNA - Low Pressure Duct Construction Standards.
- C. UL 33 - Heat Responsive Links for Fire-Protection Service.
- D. UL 555 - Fire Dampers and Ceiling Dampers.

1.03 SUBMITTALS:

- A. Submit shop drawings and product data under provisions of Section 01300.
- B. Provide shop drawings for shop-fabricated assemblies indicated, including volume control dampers, duct access doors, duct test holes. Provide product data for hardware used.
- C. Submit manufacturer's installation instructions under provisions of Section 01300, for fire dampers.

PART 2 - PRODUCTS

2.01 VOLUME CONTROL DAMPERS:

- A. Fabricate in accordance with SMACNA Low Pressure Duct Construction Standards and as indicated.
- B. Fabricate splitter dampers of material same gauge as duct to 24 inches size in either direction and two gauges heavier for sizes over 24 inches.
- C. Fabricate splitter dampers of double thickness sheet metal to streamline shape. Secure blade with continuous hinge or rod. Operate with minimum 1 1/4-inch diameter rod in self-aligning, universal joint action flanged bushing with set screw.
- D. Fabricate single blade dampers for duct sizes to 9 1/2 x 30 inches.
- E. Fabricate multi-blade damper of opposed blade pattern with maximum blade sizes 12 x 72 inch. Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.
- F. Except in round ductwork 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon or sintered bronze bearings.
- G. Provide locking, indicating quadrant regulators on single and multi-blade dampers. Where rod lengths exceed 30 inches, provide regulator at both ends.
- H. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.

2.02 ACCEPTABLE MANUFACTURERS - FIRE DAMPERS:

- A. Arrow.
- B. Ruskin.
- C. Philips.

D. Substitutions: Under provisions of Section 01630.

2.03 FIRE DAMPERS:

- A. Fabricate in accordance with NFPA 90A and UL 555, and as indicated. Dampers must carry California State Fire Marshal listing. Listing number shall be included on submittal.
- B. Fabricate ceiling firestop flaps of galvanized steel, 22 gauge frame and 16 gauge flap, two layers 0.125 inch ceramic fiber on top side, and one layer on bottom side for round flaps, with locking clip.
- C. Fabricate ceiling dampers of galvanized steel, 22 gauge frame, stainless steel closure spring, and light weight, heat retardant non-asbestos fabric blanket closure.
- D. Fabricate curtain type dampers of galvanized steel with interlocking blades. Provide stainless steel closure springs and latches for horizontal installations. Configure with blades out of air stream except for low-pressure ducts up to 12 inches in height.
- E. Fabricate multiple blade fire dampers with 16 gauge galvanized steel frame and blades, oil-impregnated bronze or stainless steel sleeve bearings and plated steel axles, 1/8 x 1/2-inch plated steel concealed linkage, stainless steel closure spring, blade stops, and lock.
- F. Fusible links, UL 33, shall separate at 160 degrees F. Provide adjustable link straps for combination fire/balancing dampers.

2.04 ACCEPTABLE MANUFACTURERS - BACKDRAFT DAMPERS:

- A. Arrow.
- B. Ruskin.
- C. Philips.
- D. Substitutions: Under provisions of Section 01630.

2.05 BACKDRAFT DAMPERS:

- A. Gravity backdraft dampers, size 18 x 18 inches or smaller, furnished with air moving equipment, may be air moving equipment manufacturers standard construction.
- B. Fabricate multi-blade, parallel action gravity balanced backdraft dampers of 16 gauge galvanized steel, or extruded aluminum, with center pivoted blades of maximum six-inch width, with felt or flexible vinyl sealed edges, linked together in rattle-free manner with 90-degree stop, steel ball bearings, and plated steel pivot pin; adjustment device to permit setting for varying differential static pressure.

2.06 AIR TURNING DEVICES:

- A. Multi-blade device with blades aligned in short dimension; steel or aluminum construction; with individually adjustable blades, mounting straps.

2.07 FLEXIBLE DUCT CONNECTIONS:

- A. Fabricate in accordance with SMACNA Low Pressure, Duct Construction Standards, and as indicated.
- B. UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 36 oz. per sq. yd., approximately six inches wide, crimped into metal edging strip.
- C. Leaded vinyl sheet, minimum 0.55 inch thick, 0.87 lb. per sq. ft., 10 dB attenuation in 10 to 10,000 Hz range.

2.08 DUCT ACCESS DOORS:

- A. Fabricate in accordance with SMACNA Low Pressure, Duct Construction Standards and as indicated.
- B. Review locations prior to fabrication.
- C. Fabricate rigid and close-fitting doors of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ductwork, install minimum one-inch thick insulation with sheet metal cover.
- D. Access doors smaller than 12 inches square may be secured with sash locks.
- E. Provide two hinges and two sash locks for sizes up to 18 inches square, three hinges and two compression latches with outside and inside handles for sizes up to 24 x 48 inches. Provide an additional hinge for larger sizes.
- F. Access doors with sheet metal screw fasteners are not acceptable.

2.09 DUCT TEST HOLES:

- A. Cut or drill temporary test holes in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.
- B. Permanent test holes shall be factory fabricated, air-tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Install accessories in accordance with manufacturer's instructions.
- B. Provide balancing dampers at points on low-pressure supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Use splitter dampers only where indicated.
- C. Provide balancing dampers on medium and high-pressure systems where indicated.
- D. Provide fire dampers at locations indicated, where ducts and outlets pass through fire rated components, and where required by authorities having jurisdiction. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings and hinges.
- E. Demonstrate re-setting of fire dampers to authorities having jurisdiction and District's representative.
- F. Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.
- G. Provide flexible connections immediately adjacent to equipment in ducts associated with fans and motorized equipment.
- H. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, and elsewhere as indicated. Provide minimum 8 x 8 inch size for hand access, 18 x 18 inch size for shoulder access, and as indicated.
- I. Provide duct test holes where indicated and required for testing and balancing purposes.

NOTES:

Fire dampers shall be State Fire Marshal approved and installed strictly per manufacturer's printed instructions.

Manufacturer's installation instructions shall be made available to the inspecting authorities.

END OF SECTION

233713
AIR OUTLETS AND INLETS

PART 1 - GENERAL

- 1.01 WORK INCLUDED:
- A. Diffusers.
 - B. Diffuser boots.
 - C. Registers/grilles.
- 1.02 REFERENCES:
- A. ADC 1062 - Certification, Rating and Test Manual.
 - B. AMCA 500 - Test Method for Louvers, Dampers and Shutters.
 - C. ANSI/NFPA 90A - Installation of Air Conditioning and Ventilating Systems.
 - D. ARI 650 - Air Outlets and Inlets.
 - E. ASHRAE 70 - Method of Testing for Rating the Air Flow Performance of Outlets and Inlets.
 - F. SMACNA - Low Pressure Duct Construction Standard.
- 1.03 QUALITY ASSURANCE:
- A. Test and rate performance of air outlets and inlets in accordance with ADC Equipment Test Code 1062 and ASHRAE 70.
 - B. Test and rate performance of louvers in accordance with AMCA 500.
 - C. Products must bear ADC or AMCA seals for performance for noise, air performance, and water penetration as applicable.
- 1.04 REGULATORY REQUIREMENTS:
- A. Conform to ANSI/NFPA 90A.
- 1.05 SUBMITTALS:
- A. Submit product data under provisions of Section 01300.
 - B. Provide product data for items required for this project.
 - C. Submit schedule of outlets and inlets indicating type, size, location, application, and noise level.
 - D. Review requirements of outlets and inlets as to size, finish, and type of mounting prior to submitting product data and schedules of outlets and inlets.
 - E. Submit one sample of each required air outlet and inlet type under provisions of Section 01300.
 - F. Submit manufacturer's installation instructions under provisions of Section 01300.

PART 2 - PRODUCTS

- 2.01 ACCEPTABLE MANUFACTURERS:
- A. Kreuger.
 - B. Titus.
 - C. J & J.
 - D. Substitutions: Under provisions of Section 01630.
- 2.02 AIR DEVICES:

- A. Provide grilles and registers as shown on the schedule on the drawings.
- B. Specifications given are minimum performance levels, no increase in noise level, decrease in throw, or decrease in air-flow performance will be acceptable.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Install items in accordance with manufacturers' instructions.
- B. Check location of outlets and inlets and make necessary adjustments in position to conform to architectural features, symmetry, and lighting arrangement.
- C. Install diffusers to ductwork with air tight connection. Provide spin in with volume damper. Hardcast joints. Provide steel band to secure flex duct to spin-in.
- D. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, regardless of whether dampers are specified as part of the diffuser, or grille and register assembly.
- E. Paint ductwork visible behind air outlets and inlets matte black. Refer to Section 09900.

3.02 AIR OUTLET AND INLET SCHEDULE: See drawings.

END OF SECTION

SECTION 234100
AIR FILTERS

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. Replaceable media filters (Rutzler Model RFC FU-6).
- B. Filter frames.

1.2 REFERENCES:

- A. ANSI/UL 900 - Test Performance of Air Filter Units.
- B. ASHRAE 52 - Method of Testing Air Cleaning Devices Used in General Ventilation for Removing Particulate Matter.

1.3 QUALITY ASSURANCE:

- A. Filter media shall be ANSI/UL 900 listed, Class 1 or Class 2, as approved by local authorities.
- B. Provide all filters as product of one manufacturer easily accessible for replacement.
- C. Assemble filter components to form filter banks from products of one manufacturer.
- D. Air filters shall be of the approved type tested in accordance with Test Method SFM-12-71-1 as shown in Part 12, Title 24, California Code of Regulations. Preformed filters having combustible framing shall be tested as a complete assembly.

1.4 SUBMITTALS:

- A. Submit shop drawings and product data under provisions of Specification Section-SUBMITTALS on filter media, filter performance data, filter assembly and filter frames. Include dimensions, motor locations and electrical connections.
- B. Submit samples under provisions of Specification Section-SUBMITTALS.
- C. Submit one sample of replacement filter media of each type and filter frame.

1.5 OPERATION AND MAINTENANCE DATA:

- A. Submit operation and maintenance data under provisions of Specification Section-PROJECT CLOSEOUT.
- B. Include instructions for operation, changing, and periodic cleaning.

1.6 EXTRA STOCK:

- A. Provide one set of filters.

1.7 DELIVERY, STORAGE AND HANDLING:

- A. Deliver material to jobsite in new, dry, unopened, and well-marked containers showing product and manufacturer's name.
- B. Material handling equipment shall be selected and operated so as not to damage equipment or existing construction.
- C. Deliver material in sufficient quantity to allow continuity of work.
- D. No material may be stored uncovered in the open or in contact with the ground.
- E. Handle material to prevent damage during transportation and installation.
- F. The Contractor shall assume full responsibility for the protection and safekeeping of products stored on premises.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

- A. Rutzler.

2.2 REPLACEABLE MEDIA FILTERS:

- A. Media: Two-inch thick fiber blanket, factory sprayed with Flameproof, non-drip, non-volatile adhesive, nominal size 24 x 24 or as shown on drawings.
- B. Rating: Minimum MERV-13 efficiency.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Install air cleaning devices in accordance with manufacturer's instructions.
- B. Prevent passage of unfiltered air around filters with felt, rubber, or neoprene gaskets.
- C. Do not operate fan system until filters (temporary or permanent) are in place. Replace temporary filters used during construction.
- D. Filters shall be installed such that they can be replaced easily and without the use of tools. Adequate clearance shall be provided to remove filters.

END OF SECTION

SECTION 235216
CONDENSING BOILERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes packaged, factory-fabricated and -assembled, gas-fired, fire-tube condensing boilers, trim, and accessories for generating hot water.

1.3 SUBMITTALS

- A. Product Data: Include performance data, operating characteristics, furnished specialties, and accessories.
- B. Shop Drawings: For boilers, boiler trim, and accessories. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Design calculations and vibration isolation base details, signed and sealed by a qualified professional engineer.
 - a. Design Calculations: Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
 - b. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include auxiliary motor slides and rails and equipment mounting frames.
 - 2. Wiring Diagrams: Power, signal, and control wiring.
- C. Manufacturer Seismic Qualification Certification: Submit certification that boiler, accessories, and components will withstand seismic forces defined in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment." Include the following:
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

- b. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- D. Source quality-control test reports.
- E. Field quality-control test reports.
- F. Operation and Maintenance Data: For boilers to include in emergency, operation, and maintenance manuals.
- G. Warranty: Special warranty specified in this Section.
- H. Other Informational Submittals:
- 1. ASME Stamp Certification and Report: Submit "A," "S," or "PP" stamp certificate of authorization, as required by authorities having jurisdiction, and document hydrostatic testing of piping external to boiler.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in CEC, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. ASME Compliance: Fabricate and label boilers to comply with ASME Boiler and Pressure Vessel Code.
- C. ASHRAE/IESNA 90.1 Compliance: Boilers shall have minimum efficiency according to "Gas and Oil Fired Boilers - Minimum Efficiency Requirements."
- D. DOE Compliance: Minimum efficiency shall comply with 10 CFR 430, Subpart B, Appendix N, "Uniform Test Method for Measuring the Energy Consumption of Furnaces and Boilers."
- E. UL Compliance: Test boilers for compliance with UL 795, "Commercial-Industrial Gas Heating Equipment." Boilers shall be listed and labeled by a testing agency acceptable to authorities having jurisdiction.

1.5 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of boilers that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period for Fire-Tube Condensing Boilers:
 - a. Leakage and Materials: 10 years from date of Substantial Completion.
 - b. Heat Exchanger Damaged by Thermal Stress and Corrosion: Prorated for five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- C. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
 - 1. Fulton Boiler Works, Inc.
 - 2. Gasmaster Industries Incorporated.
 - 3. Hydrotherm, Inc.; a division of Mestek, Inc.
 - 4. AERCO International.
 - 5. Heat Transfer Products, Inc.
 - 6. Laars Heating Systems; a division of Waterpik Technologies, Inc.

2.2 MANUFACTURED UNITS

- A. Description: Factory-fabricated, -assembled, and -tested, pulse-combustion condensing boiler with heat exchanger sealed pressure tight, built on a steel base; including insulated jacket; flue-gas vent; combustion-air intake connections; water supply, return, and condensate drain connections; and controls.
- B. Heat Exchanger: Type 316L, stainless-steel primary and secondary combustion chamber.
- C. Pressure Vessel: Carbon steel with welded heads and tube connections.
- D. Exhaust Decoupler: Fiberglass composite material in a corrosion-resistant steel box.
- E. Burner: Natural gas, self-aspirating and self-venting after initial start.

- F. Blower: Centrifugal fan to operate only during start of each burner sequence.
 - 1. Motors: Comply with requirements specified in Division 23 Section "Common Motor Requirements for HVAC Equipment."
 - a. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
- G. Gas Train: Combination gas valve with manual shutoff and pressure regulator.
- H. Ignition: Spark ignition with 100 percent main-valve shutoff with electronic flame supervision.
- I. Casing:
 - 1. Jacket: Sheet metal, with snap-in or interlocking closures.
 - 2. Control Compartment Enclosure: NEMA 250, Type 1A.
 - 3. Finish: Powder-coated protective finish.
 - 4. Insulation: Minimum 2-inch-thick, mineral-fiber insulation surrounding the heat exchanger.
 - 5. Draft Hood: Integral.
 - 6. Combustion-Air Connection: Inlet duct collar and sheet metal closure over burner compartment.
 - 7. Mounting base to secure boiler to concrete base.
 - a. Seismic Fabrication Requirements: Fabricate mounting base and attachment to boiler pressure vessel, accessories, and components with reinforcement strong enough to withstand seismic forces defined in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment" when mounting base is anchored to building structure.
- J. Mufflers: Carbon-steel intake muffler and stainless-steel exhaust.
- K. Condensate Trap: Cast-iron body with stainless-steel internal parts.
- L. Characteristics and Capacities:
 - 1. Heating Medium: Hot water.
 - 2. Design Water Pressure Rating: 150 psig
 - 3. Safety Relief Valve Setting: <Insert psig.>
 - 4. Entering-Water Temperature: 160 deg F
 - 5. Leaving-Water Temperature: 180 deg F
 - 6. Design Water Flow Rate: 96 gpm.
 - 7. Minimum Water Flow Rate: <Insert gpm.>
 - 8. Design Pressure Drop: 8.1 feet.
 - 9. Minimum Efficiency AFUE: 96.2 percent.
 - 10. Gas Input: 1999 MBh.
 - 11. AGA Output Capacity: 1923 MBh.
 - 12. Consider impact of site altitude on fan and motor.

13. Electrical Characteristics:

- a. Volts: 115 V.
- b. Phase: Single.
- c. Hertz: 60.
- d. Full-Load Amperes: 13.
- e. Minimum Circuit Ampacity: 16.

2.3 TRIM

- A. Include devices sized to comply with ANSI B31.1, "Power Piping" Retain option in paragraph below if using modulating or low-high-low firing sequence.
- B. Pressure Controllers: Operating, firing rate, and high limit.
- C. Safety Relief Valve:
 - 1. Size and Capacity: As required for equipment according to ASME Boiler and Pressure Vessel Code.
 - 2. Description: Fully enclosed steel spring with adjustable pressure range and positive shutoff; factory set and sealed.
 - a. Drip-Pan Elbow: Cast iron and having threaded inlet and outlet with threads complying with ASME B1.20.1.
- D. Pressure Gage: Minimum 3-1/2-inch diameter. Gage shall have normal operating pressure about 50 percent of full range.
- E. Water Column: Minimum 12-inch glass gage with shutoff cocks.
- F. Drain Valves: Minimum NPS 3/4 or nozzle size with hose-end connection.
- G. Blowdown Valves: Factory-installed bottom and surface, slow-acting blowdown valves same size as boiler nozzle. Blowdown valves shall be combination of slow and quick acting as required by ANSI B31.1.
- H. Stop Valves: Boiler inlets and outlets, except safety relief valves or preheater inlet and outlet, shall be equipped with stop valve in an accessible location as near as practical to boiler nozzle and same size or larger than nozzle. Valves larger than NPS 2 shall have rising stem.
- I. Stop-Check Valves: Factory-installed, stop-check valve and stop valve at boiler outlet with free-blow drain valve factory installed between the two valves and visible when operating stop-check valve.

2.4 CONTROLS

- A. Refer to Division 23 Section "Instrumentation and Control for HVAC."

B. Boiler operating controls shall include the following devices and features:

1. Control transformer.
2. Set-Point Adjust: Set points shall be adjustable.
3. Operating Pressure Control: Factory wired and mounted to cycle burner.
4. Low-Water Cutoff and Pump Control: Cycle feedwater pump(s) for makeup water control.
5. Sequence of Operation: Electric, factory-fabricated and field-installed panel to control burner firing rate to maintain space temperature in response to thermostat with heat anticipator located in heated space.
6. Sequence of Operation: Electric, factory-fabricated and field-installed panel to control burner firing rate to reset supply-water temperature inversely with outside-air temperature. At **0 deg F** outside-air temperature, set supply-water temperature at **180 deg F** ; at **60 deg F** outside-air temperature, set supply-water temperature at **160 deg F**.
7. Sequence of Operation: Electric, factory-fabricated and field-installed panel to control burner firing rate to maintain a constant steam pressure. Maintain pressure set point plus or minus 10 percent.
 - a. Include automatic, alternating-firing sequence for multiple boilers to ensure maximum system efficiency throughout the load range and to provide equal runtime for boilers.

C. Burner Operating Controls: To maintain safe operating conditions, burner safety controls limit burner operation.

1. High Cutoff: Automatic reset stops burner if operating conditions rise above maximum boiler design pressure.
2. Low-Water Cutoff Switch: Electronic probe shall prevent burner operation on low water. Cutoff switch shall be automatic-reset type.
3. Blocked Inlet Safety Switch: Manual-reset pressure switch field mounted on boiler combustion-air inlet.
4. Audible Alarm: Factory mounted on control panel with silence switch; shall sound alarm for above conditions.

D. Building Automation System Interface: Factory install hardware and software to enable building automation system to monitor, control, and display boiler status and alarms.

1. Hardwired Points:
 - a. Monitoring: On/off status, common trouble alarm.
 - b. Control: On/off operation, hot water supply temperature set-point adjustment.
2. A communication interface with building automation system shall enable building automation system operator to remotely control and monitor the boiler from an operator workstation. Control features available, and monitoring points displayed, locally at boiler control panel shall be available through building automation system.

2.5 ELECTRICAL POWER

- A. Controllers, Electrical Devices, and Wiring: Electrical devices and connections are specified in Division 26 Sections.
- B. Single-Point Field Power Connection: Factory-installed and -wired switches, motor controllers, transformers, and other electrical devices necessary shall provide a single-point field power connection to boiler.
 - 1. House in NEMA 250, Type 1 enclosure.
 - 2. Wiring shall be numbered and color-coded to match wiring diagram.
 - 3. Install factory wiring outside of an enclosure in a metal raceway.
 - 4. Field power interface shall be to fused disconnect switch.
 - 5. Provide branch power circuit to each motor and to controls with a disconnect switch or circuit breaker.
 - 6. Provide each motor with overcurrent protection.

2.6 VENTING KITS

- A. Kit: Complete system, ASTM A 959, Type 29-4C stainless steel, pipe, vent terminal, thimble, indoor plate, vent adapter, condensate trap and dilution tank, and sealant.
- B. Combustion-Air Intake: Complete system, stainless steel, pipe, vent terminal with screen, inlet air coupling, and sealant.

2.7 SOURCE QUALITY CONTROL

- A. Burner and Hydrostatic Test: Factory adjust burner to eliminate excess oxygen, carbon dioxide, oxides of nitrogen emissions, and carbon monoxide in flue gas and to achieve combustion efficiency; perform hydrostatic test.
- B. Test and inspect factory-assembled boilers, before shipping, according to ASME Boiler and Pressure Vessel Code.
- C. Allow Owner access to source quality-control testing of boilers. Notify Architect 14 days in advance of testing.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Before boiler installation, examine roughing-in for concrete equipment bases, anchor-bolt sizes and locations, and piping and electrical connections to verify actual locations, sizes, and other conditions affecting boiler performance, maintenance, and operations.
 - 1. Final boiler locations indicated on Drawings are approximate. Determine exact locations before roughing-in for piping and electrical connections.

- B. Examine mechanical spaces for suitable conditions where boilers will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 BOILER INSTALLATION

- A. Install boilers level on concrete base. Concrete base is specified in Division 23 Section "Common Work Results for HVAC," and concrete materials and installation requirements are specified in Division 03.
- B. Vibration Isolation: Elastomeric isolation pads with a minimum static deflection of 0.25 inch. Vibration isolation devices and installation requirements are specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."
- C. Install gas-fired boilers according to NFPA 54.
- D. Assemble and install boiler trim.
- E. Install electrical devices furnished with boiler but not specified to be factory mounted.
- F. Install control wiring to field-mounted electrical devices.

3.3 CONNECTIONS

- A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to boiler to allow service and maintenance.
- C. Install piping from equipment drain connection to nearest floor drain. Piping shall be at least full size of connection. Provide an isolation valve if required.
- D. Connect piping to boilers, except safety relief valve connections, with flexible connectors of materials suitable for service. Flexible connectors and their installation are specified in Division 23 Section "Common Work Results for HVAC,"
- E. Connect gas piping to boiler gas-train inlet with union. Piping shall be at least full size of gas train connection. Provide a reducer if required.
- F. Connect hot-water piping to supply- and return-boiler tapplings with shutoff valve and union or flange at each connection.
- G. Connect steam and condensate piping to supply-, return-, and blowdown-boiler tapplings with shutoff valve and union or flange at each connection.
- H. Install piping from safety relief valves to nearest floor drain.
- I. Install piping from safety valves to drip-pan elbow and to nearest floor drain.
- J. Boiler Venting:

1. Install flue venting kit and combustion-air intake.
2. Connect full size to boiler connections.

K. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

L. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.4 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:

1. Perform installation and startup checks according to manufacturer's written instructions.
2. Leak Test: Hydrostatic test. Repair leaks and retest until no leaks exist.
3. Operational Test: Start units to confirm proper motor rotation and unit operation. Adjust air-fuel ratio and combustion.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - a. Check and adjust initial operating set points and high- and low-limit safety set points of fuel supply, water level and water temperature.
 - b. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

C. Remove and replace malfunctioning units and retest as specified above.

D. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other than normal occupancy hours for this purpose.

E. Performance Tests:

1. Engage a factory-authorized service representative to inspect component assemblies and equipment installations, including connections, and to conduct performance testing.
2. Boilers shall comply with performance requirements indicated, as determined by field performance tests. Adjust, modify, or replace equipment to comply.
3. Perform field performance tests to determine capacity and efficiency of boilers.
 - a. Test for full capacity.
 - b. Test for boiler efficiency at low fire 20, 40, 60, 80, 100, 80, 60, 40, and 20 percent of full capacity. Determine efficiency at each test point.

4. Repeat tests until results comply with requirements indicated.
5. Provide analysis equipment required to determine performance.
6. Provide temporary equipment and system modifications necessary to dissipate the heat produced during tests if building systems are not adequate.
7. Notify Architect in advance of test dates.
8. Document test results in a report and submit to Architect.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain boilers. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION

SECTION 235513
FUEL-FIRED DUCT HEATERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes gas-fired duct heaters.

1.3 SUBMITTALS

- A. Product Data: For each type of gas-fired duct heater indicated. Include rated capacities, operating characteristics, and accessories.
- B. Shop Drawings: For gas-fired duct heaters include plans, elevations, sections, details, and attachments to other work.
 - 1. Prepared by or under the supervision of a qualified professional engineer detailing fabrication and assembly of gas-fired duct heaters, as well as procedures and diagrams.
 - 2. Design Calculations: Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
 - 3. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 4. Wiring Diagrams: Signal and control wiring.
- C. Coordination Drawings: Plans, elevations, and other details, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
 - 1. Structural members to which equipment will be attached.
 - 2. Items penetrating roof and the following:
 - a. Duct, vent, and gas piping rough-ins and connections.
- D. Manufacturer Seismic Qualification Certification: Submit certification that gas-fired duct heaters, accessories, and components will withstand seismic forces.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

- a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
 - b. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."
 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- E. Field quality-control test reports.
- F. Operation and Maintenance Data: For gas-fired duct heaters to include in emergency, operation, and maintenance manuals.
- G. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in CEC, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. ASHRAE/IESNA 90.1-2004 Compliance: Applicable requirements in ASHRAE/IESNA 90.1-2004, Section 6 - "Heating, Ventilating, and Air-Conditioning."

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace heat exchanger of gas-fired duct heater that fails in materials or workmanship within specified warranty period.
 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

- 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:

- C. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
1. Lennox Industries, Inc.
 2. Modine Manufacturing Company.
 3. Reznor/Thomas & Betts Corporation.
 4. Sterling HVAC Products; Div. of Mestek Technology Inc.
- D. Description: Factory assembled, piped, and wired; and complying with ANSI Z83.8/CSA 2.6.
- E. Fuel Type: Design burner for natural gas having characteristics same as those of gas available at Project site.
- F. Type of Venting: Power vented.
1. Concentric, Terminal Vent Assembly: Combined combustion-air inlet and power-vent outlet with wall or roof caps. Include adapter assembly for connection to inlet and outlet pipes, and flashing for wall or roof penetration.
- G. Indoor External Housing: Steel cabinet with integral support inserts and removable bottom arranged to serve as drain pan.
1. External Casings and Cabinets: Baked enamel over corrosion-resistant-treated surface.
 2. Suspension Attachments: Reinforce suspension attachments at connection to gas-fired duct heaters.
 - a. Seismic Fabrication Requirements: Fabricate suspension attachments of gas-fired duct heaters, accessories mountings, and components with reinforcement strong enough to withstand seismic forces defined in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment" when gas-fired duct heater is anchored to building structure.
- H. Internal Casing: Aluminized steel, arranged to contain airflow, with duct flanges at inlet and outlet.
- I. Heat Exchanger: Aluminized steel.
- J. Burner Material: Stainless steel.
- K. Power Venter: Integral, motorized centrifugal fan interlocked with gas valve.
- L. Controls: Regulated redundant gas valve containing pilot solenoid valve, electric gas valve, pilot filter, pressure regulator, pilot shutoff, and manual shutoff all in one body.
1. Gas Control Valve: Single stage.
 2. Ignition: Electronically controlled electric spark with flame sensor.
 3. Fan Thermal Switch: Operates fan on heat-exchanger temperature.
 4. Vent Flow Verification: Differential pressure switch to verify open vent.
 5. Control transformer.

6. High Limit: Thermal switch or fuse to stop burner.
7. Thermostat: Devices and wiring are specified in Division 23 Section "Instrumentation and Control for HVAC."
8. Thermostat: Single-stage, wall-mounting type with 50 to 90 deg F operating range and fan on switch.

M. Capacities and Characteristics:

1. Flue Outlet: 8 inches diameter.
2. Gas Input: 250,000 Btu/h.
3. Gas Output: 202,500 Btu/h.
4. Minimum Combustion Efficiency: 81 percent.
5. Minimum Airflow: 6000 cfm.
6. External Static Pressure: 0.5 inches wg.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install and connect gas-fired duct heaters and associated fuel and vent features and systems according to NFPA 54, applicable local codes and regulations, and manufacturer's written installation instructions.
- B. Suspended Units: Suspend from substrate using threaded rods, spring hangers, and building attachments. Secure rods to unit hanger attachments. Adjust hangers so unit is level and plumb.
 1. Restrain the unit to resist code-required horizontal acceleration.

3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to gas-fired duct heaters to allow service and maintenance.
- C. Gas Piping: Connect gas piping to gas train inlet; provide union with enough clearance for burner removal and service.
- D. Duct Connections: Comply with Division 23 Section Metal Ducts.
- E. Electrical Connections: Comply with applicable requirements in Division 26 Sections.
 1. Install electrical devices furnished with heaters but not specified to be factory mounted.

3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.
- B. Perform tests and inspections and prepare test reports.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- C. Tests and Inspections:
 - 1. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - 2. Verify bearing lubrication.
 - 3. Verify proper motor rotation.
 - 4. Test Reports: Prepare a written report to record the following:
 - a. Test procedures used.
 - b. Test results that comply with requirements.
 - c. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
- D. Remove and replace malfunctioning units and retest as specified above.

3.4 ADJUSTING

- A. Adjust initial temperature set points.
- B. Adjust burner and other unit components for optimum heating performance and efficiency.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain gas-fired duct heaters. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION

SECTION 235533
FUEL-FIRED UNIT HEATERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes gas-fired unit heaters.

1.3 SUBMITTALS

- A. Product Data: For each type of fuel-fired unit heater indicated. Include rated capacities, operating characteristics, and accessories.
- B. Shop Drawings: For fuel-fired unit heaters include plans, elevations, sections, details, and attachments to other work.
 - 1. Prepared by or under the supervision of a qualified professional engineer detailing fabrication and assembly of fuel-fired unit heaters, as well as procedures and diagrams.
 - 2. Design Calculations: Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
 - 3. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 4. Wiring Diagrams: Power, signal, and control wiring.
- C. Coordination Drawings: Plans, elevations, and other details, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
 - 1. Structural members to which equipment will be attached.
 - 2. Items penetrating roof and the following:
 - a. Vent and gas piping rough-ins and connections.
- D. Manufacturer Seismic Qualification Certification: Submit certification that fuel-fired unit heaters, accessories, and components will withstand seismic forces.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

- a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
 - b. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."
 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- E. Field quality-control test reports.
- F. Operation and Maintenance Data: For fuel-fired unit heaters to include in emergency, operation, and maintenance manuals.
- G. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in CEC, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. ASHRAE/IESNA 90.1-2004 Compliance: Applicable requirements in ASHRAE/IESNA 90.1-2004, Section 6 - "Heating, Ventilating, and Air-Conditioning."

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace heat exchanger of fuel-fired unit heater that fails in materials or workmanship within specified warranty period.
 1. Warranty Period: Two years from date of Substantial Completion.

1.6 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Fan Belts: One for each belt-driven fan size.

PART 2 - PRODUCTS

2.1 GAS-FIRED UNIT HEATERS

- 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:
- C. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
 - 1. Lennox Industries, Inc.
 - 2. Modine Manufacturing Company.
 - 3. Reznor/Thomas & Betts Corporation.
 - 4. Sterling HVAC Products; Div. of Mestek Technology Inc.
- D. Description: Factory assembled, piped, and wired, and complying with ANSI Z83.8/CSA 2.6.
- E. Fuel Type: Design burner for natural gas having characteristics same as those of gas available at Project site.
- F. Type of Venting: Powered vented.
- G. Housing: Steel, with integral draft hood and inserts for suspension mounting rods.
 - 1. External Casings and Cabinets: Baked enamel over corrosion-resistant-treated surface.
 - 2. Suspension Attachments: Reinforce suspension attachments at connection to fuel-fired unit heaters.
 - a. Seismic Fabrication Requirements: Fabricate suspension attachments of fuel-fired unit heaters, accessories mountings, and components with reinforcement strong enough to withstand seismic forces defined in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment" when fuel-fired unit heater is anchored to building structure.
- H. Heat Exchanger: Stainless steel.
- I. Burner Material: Stainless steel.
- J. Unit Fan: Aluminum propeller blades riveted to heavy-gage steel spider bolted to cast-iron hub, dynamically balanced, and resiliently mounted.
 - 1. Fan-Blade Guard: Galvanized steel, complying with OSHA specifications, removable for maintenance.
- K. Unit Fan: Steel, centrifugal fan dynamically balanced and resiliently mounted.

1. Belt-Driven Drive Assembly: Resiliently mounted to housing, with the following features:
 - a. Fan Shaft: Turned, ground, and polished steel; keyed to wheel hub.
 - b. Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings.
 - c. Pulleys: Cast-iron, adjustable-pitch motor pulley.
- L. Controls: Regulated redundant gas valve containing pilot solenoid valve, electric gas valve, pilot filter, pressure regulator, pilot shutoff, and manual shutoff all in one body.
 1. Gas Control Valve: Two stage.
 2. Ignition: Electronically controlled electric spark with flame sensor.
 3. Fan Thermal Switch: Operates fan on heat-exchanger temperature.
 4. Vent Flow Verification: Differential pressure switch to verify open vent.
 5. Control transformer.
 6. High Limit: Thermal switch or fuse to stop burner.
 7. Thermostats: Devices and wiring are specified in Division 23 Section "Instrumentation and Control for HVAC."
 8. Thermostat: Two-stage, wall-mounting type with 50 to 90 deg F operating range and fan on switch.
 9. operating range.
- M. Discharge Louvers: Independently adjustable horizontal blades.
- N. Accessories:
 1. Vertical discharge louvers.
 2. Discharge Nozzle: Discharge at 50 to 90 degrees from horizontal.
 3. Four-point suspension kit.
 4. Summer fan switch.
 5. Unit-mounted thermostat bracket.
 6. Power Venter: Centrifugal aluminized-steel fan, with stainless-steel shaft; 120-V ac motor.
 7. Concentric, Terminal Vent Assembly: Combined combustion-air inlet and power-vent outlet with wall or roof caps. Include adapter assembly for connection to inlet and outlet pipes, and flashing for wall or roof penetration.
- O. Capacities and Characteristics:
 1. Gas Input: 120,000 Btu/h.
 2. Gas Output: 99,600 Btu/h.
 3. Minimum Combustion Efficiency: 80 percent.
 4. Minimum Airflow: 1537 **cfm**.
 5. External Static Pressure: 0.25 **inches wg**.
 6. Motor Size: .05 HP.
 7. Electrical Characteristics:
 - a. Volts: 120 V.
 - b. Phase: Single.
 - c. Hertz: 60.

- d. Minimum Circuit Ampacity: 5.6

2.2 OIL-FIRED UNIT HEATERS

- 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:
- C. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
1. Modine Manufacturing Company.
 2. Reznor/Thomas & Betts Corporation.
 3. Sterling HVAC Products; Div. of Mestek Technology Inc.
- D. Description: Factory assembled, piped, and wired, and complying with UL 731.
- E. Housing: Steel, with inserts for suspension mounting rods.
1. External Casings and Cabinets: Baked enamel over corrosion-resistant-treated surface.
 2. Suspension Attachments: Reinforce suspension attachments at connection to fuel-fired unit heaters.
 - a. Seismic Fabrication Requirements: Fabricate suspension attachments of fuel-fired unit heaters, accessories mountings, and components with reinforcement strong enough to withstand seismic forces defined in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment" when fuel-fired unit heater is anchored to building structure.
- F. Heat Exchanger: Minimum 0.09-inch steel.
- G. Burners: Flame-retention, pressure-atomizing, forced-draft, gun type; with integral fuel pump and electronic spark ignition and flame safety.
1. Safety Device: Oil-pressure switch.
- H. Unit Fan: Propeller fan with aluminum blades dynamically balanced and resiliently mounted.
1. Steel fan-blade guard.
 - a. Controllers, Electrical Devices, and Wiring: Electrical devices and connections are specified in Division 26 Sections.
- I. Controls: Factory piped and prewired to electrical junction box mounted on unit, including the following:

1. Control Transformer: Integrally mounted, 120 to 24 V ac.
 2. Cad-cell safety system.
 3. Manual reset safety.
 4. Thermostat: 2-stage, 24-V ac, wall-mounting type with 50 to 90 deg F operating range and fan on switch.
- J. Automatic Fan Thermal Switch: Fan operates with heat-exchanger temperature more than 135 deg F.
- K. Discharge Louvers: Independently adjustable horizontal blades.
- L. Accessories:
1. Vertical discharge louvers.
 2. Discharge Nozzle: Discharge at 50 to 90 degrees from horizontal.
 3. Unit-mounted thermostat bracket.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install and connect gas-fired unit heaters and associated fuel and vent features and systems according to NFPA 54, applicable local codes and regulations, and manufacturer's written installation instructions.
- B. Install and connect oil-fired unit heaters and associated fuel and vent piping according to NFPA 31, applicable local codes and regulations, and manufacturer's written installation instructions.
- C. Suspended Units: Suspend from substrate using threaded rods, spring hangers, and building attachments. Secure rods to unit hanger attachments. Adjust hangers so unit is level and plumb.
1. Restrain the unit to resist code-required horizontal acceleration.
- D. Substrate-Mounted Units: Provide supports connected to substrate. Secure units to supports.
1. Spring hangers and seismic restraints are specified.
 2. Anchor the unit to resist code-required horizontal acceleration.

3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to fuel-fired unit heater to allow service and maintenance.

- C. Gas Piping: Connect gas piping to gas train inlet; provide union with enough clearance for burner removal and service.
- D. Electrical Connections: Comply with applicable requirements in Division 26 Sections.
 - 1. Install electrical devices furnished with heaters but not specified to be factory mounted.

3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.
- B. Perform tests and inspections and prepare test reports.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- C. Tests and Inspections:
 - 1. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - 2. Verify bearing lubrication.
 - 3. Verify proper motor rotation.
 - 4. Test Reports: Prepare a written report to record the following:
 - a. Test procedures used.
 - b. Test results that comply with requirements.
 - c. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
- D. Remove and replace malfunctioning units and retest as specified above.

3.4 ADJUSTING

- A. Adjust initial temperature set points.
- B. Adjust burner and other unit components for optimum heating performance and efficiency.

DEMONSTRATION

- C. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fuel-fired unit heaters. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION

237413
AIR HANDLING UNITS WITH COILS

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. Packaged air handling units.

1.02 REFERENCES:

- A. AMCA 99 - Standards Handbook.
- B. AMCA 210 - Laboratory Methods of Testing Fans for Rating Purposes.
- C. AMCA 300 - Test Code for Sound Rating Air Moving Devices.
- D. AMCA 301 - Method of Publishing Sound Ratings for Air Moving Devices.
- E. AMCA 500 - Test Methods for Louver, Dampers, and Shutters.
- F. ANSI/AFBMA 9 - Load Ratings and Fatigue Life for Ball Bearings.
- G. ANSI/AFBMA 11 - Load Ratings and Fatigue Life for Roller Bearings.
- H. ANSI/UL 900 - Test Performance of Air Filter Units.
- I. ARI 410 - Forced-Circulation Air-Cooling and Air-Heating Coils.
- J. ARI 430 - Standard for Central-Station Air-Handling Units.
- K. ARI 435 - Standard for Application of Central-Station Air- Handling Units.
- L. NFPA 90A - Installation of Air Conditioning and Ventilation Systems.
- M. SMACNA - Low Pressure Duct Construction Standards.

1.03 QUALITY ASSURANCE:

- A. Fan Performance Ratings: Conform to AMCA 210 and bear the AMCA Certified Rating Seal.
- B. Sound Ratings: AMCA 301; tested to AMCA 300 and bear AMCA Certified Sound Rating Seal.
- C. Fabrication: Conform to AMCA 99 and ARI 430.
- D. Filter Media ANSI/UL 900 listed, Class I or Class II, approved by State Fire Marshal. See Section 15880.
- E. Air Coils: Certify capacities, pressure drops, and selection procedures in accordance with ARI 410.
- F. Air Handling Units: Product of manufacturer regularly engaged in production of components and who issues complete catalog data on total product.

1.04 SUBMITTALS:

- A. Submit shop drawings and product data under provisions of Section 01300.
- B. Shop drawings shall indicate assembly, unit dimensions, weight loading, required clearances, construction details, and field connection details.
- C. Product data shall indicate dimensions, weights, capacities, ratings, fan performance, motor electrical characteristics, and gauges and finishes of materials.
- D. Provide fan curves with specified operating point clearly plotted.
- E. Submit sound power levels for both fan outlet and casing radiation at rated capacity.
- F. Submit product data of filter media, filter performance data, filter assembly, and filter frames.
- G. Submit electrical requirements for power supply wiring including wiring diagrams for interlock and control wiring, clearly indicating factory-installed and field-installed wiring.

- H. Submit one sample of replacement filter media with frame, under provisions of Section 15050.
 - I. Submit manufacturer's installation instructions under provisions of Section 01300.
- 1.05 OPERATION AND MAINTENANCE DATA:
- A. Submit operation and maintenance data under provisions of Section 01700.
 - B. Include instructions for lubrication, filter replacement, motor and drive replacement, spare parts lists, and wiring diagrams.
- 1.06 DELIVERY, STORAGE AND HANDLING:
- A. Deliver material to job-site in new, factory-fabricated protective containers, dry, unopened, and well-marked showing product and manufacturer's name on shipping skids and lifting legs.
 - B. Material handling equipment shall be selected and operated so as not to damage equipment or existing construction.
 - C. Deliver material in sufficient quantity to allow continuity of work.
 - D. No material may be stored uncovered in the open or in contact with the ground.
 - E. Handle material to prevent damage during transportation and installation.
 - F. The Contractor shall assume full responsibility for the protection and safekeeping of products stored on premises.
- 1.07 ENVIRONMENTAL REQUIREMENTS:
- A. Do not operate units for any purpose, temporary or permanent, until ductwork is clean, filters are in place, bearings lubricated, and fan has been test run under observation.
- 1.08 EXTRA STOCK:
- A. Provide one complete set of filters.

PART 2 - PRODUCTS

- 2.01 ACCEPTABLE MANUFACTURERS:
- A. Seasons-4 (Basis of design. All alternates and substitutions subject to DSA review and approval)
 - B. Alliance
 - C. Unitech
 - D. Substitutions: Under provisions of Section 012513.01.
- 2.02 GENERAL:
- A. Fabricate draw-thru type air handling units suitable for low-pressure operation.
 - B. Fabricate units with fan or fan and coil section plus accessories, including heating coil, mixing box section, filter section, and cooling coil section.
 - C. Factory-fabricate and test air handling units of sizes, capacities, and configuration as indicated and specified.
 - D. Base performance on sea level conditions.
- 2.03 CASING - INDOOR:
- A. Construct of 16 gauge galvanized steel on channel base or drain pan. Fabricate

channel base and drain pans of welded steel coated externally with zinc chromate, iron oxide, or phenolic resin paint. Extend coil, vent, and drain lines outside of casing at factory.

- B. Insulate casing sections with one inch thick, 3 lbs per cu. ft. density, neoprene coated, glass fiber insulation, "K" value at 75 degrees F maximum 0.26 Btu/inch/sq. ft./degrees F/hr, applied to internal surfaces with adhesive and weld pins. Coat exposed edges of insulation with adhesive. Insulation and adhesive: Conform to NFPA 90A.
- C. Finish casings with zinc chromate, iron oxide, or phenolic resin paint. Seal fixed joints with flexible weathertight sealer. Seal removable joints with closed-cell foam gasket. Provide cap strips over roof flanges. Provide rain caps and gaskets on access doors.
- D. Provide inspection doors of galvanized steel for flush mounting, with gasket, latch, and handle assembly. Provide welded channel frame to set door out from casing to permit external insulation. No tools required to open doors.
- E. Construct drain pans from double thickness galvanized steel with 1" fiberglass insulation between layers with welded corners. Cross break and pitch to drain connection. Provide drain pans under cooling coil section.
- F. Provide structure to brace casings for suction pressure of 2.5-inch wg, with maximum deflection of 1 in 200.

2.04 CASING - OUTDOORS:

- A. Air handlers shall be designed for outdoor use with a factory structural base, and a metal perimeter curb.
- B. Weatherized indoor units not acceptable.

2.05 FANS:

- A. Provide fan section with forward curved, double width, double inlet, centrifugal type fan.
- B. Provide self-aligning, grease lubricated, ball or roller bearings with lubrication fittings extended to exterior of fan casing with copper tube and zerk fitting rigidly attached to casing.
- C. Mount fan and motor internally on welded steel base coated with zinc chromate, iron oxide, or phenolic resin paint. Factory mount motor on slide rails. Provide access to motor, drive, and bearings through removable casing panels or hinged access doors. Mount base on vibration isolators (minimum 2" deflection).
- D. Mount motor drive and belt guard on integral casing framework on exterior of casing. Mount casing on vibration isolators.

2.06 MOTORS AND DRIVES:

- A. Motors: As indicated. Include integral motor starter in compliance with Division 16 - Square D Class 8536 or equivalent.
- B. Bearings: ANSI/AFBMA 9, L-50 life at 200,000 hours, heavy duty pillow block type, self-aligning, grease-lubricated ball bearings, or ANSI/AFBMA 11, L-50 life at 400,000 hours pillow block type, self-aligning, grease-lubricated roller bearings.
- C. Shafts: Solid hot rolled steel, ground and polished, with key-way, and protectively coated with lubricating oil.
- D. V-Belt Drive: Cast iron or steel sheaves, dynamically balanced, bored to fit shafts and keyed. Variable and adjustable pitch sheaves for motors 15 hp and under selected so required rpm is obtained with sheaves set at mid-position; fixed sheave for 20 hp and over, matched belts, and drive rated as recommended by manufacturer

or minimum 1.5 times nameplate rating of the motor.

- E. Belt Guard: Fabricate to SMACNA Low Pressure Duct Construction Standards; of 12 gauge, 3/4-inch diamond mesh wire screen welded to steel angle frame or equivalent, prime coated. Secure to fan or fan supports without short circuiting vibration isolation, with provision for adjustment of belt tension, lubrication, and use of tachometer with guard in place.

2.07 COILS:

- A. Provide coil section with coils and access to both sides of coils. Enclose coils with headers and return bends fully contained within casing. Slide coils into casing through removable end panel with blank off sheets and sealing collars at connection penetrations.
- B. Provide coils indicated for hot water heating, and water cooling.
- C. Size coils per schedule on drawings.

2.08 FILTERS:

- A. Provide filter box of galvanized steel with filter guides, access doors from both sides, for side or face loading.
- B. Provide extended surface filter box with holding frames and blank-off sheets, extended surface retained media filters with 30 percent dust spot efficiency.
- C. Provide filter gauges 3 1/2-inch diameter diaphragm actuated dial in metal case, with static pressure tips.

2.09 DAMPERS:

- A. Provide mixing boxes with factory mounted outside and return air dampers of galvanized steel with vinyl bulb edging and edge seals in galvanized frame, with galvanized steel axles in selflubricating nylon bearings, in opposed blade arrangement with damper blades positioned across short air opening dimension. Maximum leakage rates of 0.2% at 2" differential.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Install in accordance with manufacturer's instructions and in conformance with ARI 435.
- B. Install unit on vibration isolators.

3.02 AIR HANDLING UNIT SCHEDULE:

- A. See schedule on drawings.

END OF SECTION

237433
PACKAGED AIR CONDITIONING UNITS

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. Packaged roof top unit shall have a minimum of a 13 seer rating.
- B. Unit controls.
- C. Roof mounting frame and base.
- D. New sheet metal platform covers.
- E. Galvanized condensate piping and necessary connections.
- F. Rigid pipe gas line and all necessary connections.
- G. All necessary supply and return air connectors.
- H. All necessary electrical connections.
- I. Galvanized transition to existing duct work.
- J. All necessary paperwork for rebate filing process.
- K. Connect to the EMS system.

1.02 REFERENCES:

- A. ANSI/NFPA 90A - Installation of Air Conditioning and Ventilation Systems.
- B. ARI 210 - Unitary Air-Conditioning Equipment.
- C. ARI 240 - Air Source Unitary Heat Pump Equipment.
- D. ARI 270 - Sound Rating of Outdoor Unitary Equipment.

1.03 SUBMITTALS:

- A. Submit shop drawings and product data under provisions of Section 01300.
- B. Submit shop drawings and product data for manufactured products and assemblies required for this project.
- C. Indicate electrical service and duct connections on shop drawings or product data. Show AGA approval.
- D. Submit manufacturer's installation instructions under provisions of Section 01300.

1.04 OPERATION AND MAINTENANCE DATA:

- A. Submit operation and maintenance data under provisions of Section 01700.
- B. Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.

1.05 DELIVERY, STORAGE AND HANDLING:

- A. Protect units from physical damage by storing off site until roof mounting frames are in place, ready for immediate installation of units.
- B. Deliver unit to job-site in new, dry, unopened, and well-marked containers showing product and manufacturer's name.
- C. Material handling equipment shall be selected and operated so as not to damage unit or existing construction.
- D. No material may be stored uncovered in the open or in contact with the ground.
- E. Handle unit to prevent damage during transportation and installation.
- F. The Contractor shall assume full responsibility for the protection and safekeeping of products.

1.06 WARRANTY:

- A. Provide five-year manufacturer's warranty.
- B. Warranty: Include coverage of refrigeration compressors, heat exchangers, etc.

1.07 EXTRA MATERIALS:

- A. Provide one set of disposable replacement filters (total of two sets).

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

- A. Carrier (Basis of design, all other alternates/substitutions subject to DSA review)
- B. Day & Night.
- C. Payne.
- D. Trane.
- E. York.
- F. Substitutions: Under provisions of Section 012513.01.

2.02 MANUFACTURED UNITS:

- A. Provide roof-mounted units having gas burner, and electric refrigeration.
- B. Unit shall be self-contained, packaged, factory assembled and prewired, consisting of cabinet and frame, supply fan, heat exchanger and burner, controls, air filters, refrigerant cooling coil and compressor, condenser coil and condenser fan.

2.03 FABRICATION:

- A. Cabinet Galvanized steel with baked enamel finish, access doors or removable access panels with quick fasteners screwdriver operated flush cam type. Structural members shall be minimum 18-gauge, with access doors or removable panels of minimum 20-gauge.
- B. Insulation: One-inch thick neoprene coated glass fiber on surfaces where conditioned air is handled. Protect edges from erosion.
- C. Heat Exchangers: Aluminized steel of welded construction.
- D. Supply Fan: Forward curved centrifugal type, resiliently mounted direct drive blower.
- E. Air Filters: One-inch thick glass fiber disposable media.
- F. Roof Mounting Frame: Fourteen inches high galvanized steel, channel frame with gaskets, nailer strips.

2.04 BURNER:

- A. Gas Burner: Atmospheric type burner with adjustable combustion air supply, pressure regulator, gas valves, manual shut-off, intermittent spark or glow coil ignition, flame sensing device, and automatic 100 percent shut-off pilot. AGA approved.
- B. Gas Burner Safety Controls: Energize ignition, limit time for establishment of flame, prevent opening of gas valve until pilot flame is proven, stop gas flow on ignition failure, energize blower motor, and after air flow proven and slight delay, allow gas valve to open.
- C. High Limit Control: Temperature sensor with fixed stop at maximum permissible setting, de-energize burner on excessive bonnet temperature and energize burner when temperature drops to lower safe value.
- D. Supply Fan Control: Temperature sensor sensing bonnet temperatures and independent of burner controls, or adjustable time delay relays with switch for continuous fan operation.

- 2.05 REFRIGERANT:
A. Refrigerant mix or blends will not be accepted.
- 2.06 EVAPORATOR COIL:
A. Provide copper or aluminum tube aluminum fin coil assembly with galvanized drain pan and connection.
B. Provide capillary tubes or thermostatic expansion valves for units of six tons capacity and less, and thermostatic expansion valves and alternate row circuiting for units 7.5 tons cooling capacity and larger.
- 2.07 COMPRESSOR:
A. Provide hermetic or semi-hermetic compressor, 3600 rev/min maximum, resiliently mounted with positive lubrication, crankcase heater, high and low pressure safety controls, motor overload protection, suction and discharge service valves and gauge ports, and filter drier.
B. Five-minute timed off circuit shall delay compressor start.
C. Outdoor thermostat shall be adjustable from 30 degrees to 80 degrees.
- 2.08 CONDENSER:
A. Provide copper or aluminum tube aluminum fin coil assembly with sub cooling rows.
B. Provide direct drive propeller fans, resiliently mounted with fan guard, motor overload protection, wired to operate with compressor.
C. Provide refrigerant pressure switches or outdoor thermostat to cycle condenser fans.
- 2.09 SUPPLY/RETURN CASING:
A. Outside air or fresh air damper shall be adjustable
B. Gaskets: Provide tight fitting dampers with edge gaskets, maximum leakage 5 percent at two-inch pressure differential.
C. Damper Operator: If contract calls for economizer they shall be a pneumatic piston or gear driven type with spring return and pilot positioner.
D. Mixed Air Controls: Maintain selected supply air temperature and return dampers to minimum position on call for heating and when ambient air temperature exceeds return air temperature.
- 2.10 PERFORMANCE:
A. See schedule on drawings for performance characteristics of individual units. Heating and cooling capacities are to be -0% and +20% deviation.
B. Scheduled performance is based on ARI 210 test conditions. Sound Rating Numbers are in accordance with ARI 270.
C. Rated cooling capacity is based on 105 degrees F condenser ambient air.

PART 3 - EXECUTION

- 3.01 EXAMINATION:
A. Verify that roof is ready to receive work and opening dimensions are as indicated on shop drawings, or illustrated by the manufacturer.
B. Verify that proper power supply is available.
- 3.02 INSTALLATION:

- A. Install in accordance with manufacturer's instructions.
- B. Mount units on factory built roof-mounting frame providing watertight enclosure to protect ductwork and utility services. Install roof mounting frame level.

3.03 MANUFACTURER'S FIELD SERVICES:

- A. Provide initial start-up and shut-down during first year of operation, including routine servicing and check-out.

END OF SECTION

SECTION 26 0050
GENERAL CONDITIONS FOR ELECTRICAL WORK

PART 1 - GENERAL

1.1 GENERAL CONDITIONS

- A. The general provisions of the Contract, including General Conditions and Specification Division 1, General Requirements, shall form a part of this Section, with the same force and effect as though repeated here. The provisions of this Section shall apply to all of the following Sections of Division 26 of these Specifications and shall be considered a part of these Sections.

1.2 QUALITY ASSURANCE

- A. All work and materials shall fully comply with current rules and regulations of all applicable codes. Nothing in these Drawings or Specifications shall be interpreted as to permit any work not in compliance with these codes. Where work is detailed and/or specified to a more restrictive standard or higher requirement, that standard or requirement shall govern such work. Applicable codes include, but are not limited to, the following:
1. California Code of Regulations (CCR)
 - a. Title 8, Industrial Relations
 - b. Title 17, Public Health
 - c. Title 24, Building Standards
 2. 2022 California Building Code.
 3. 2022 California Fire Code.
 4. 2022 California Electrical Code.
 5. Local Codes.
- B. All electrical components, devices and accessories shall be listed with Underwriters Laboratories, Inc. (or other testing agency acceptable to authorities having jurisdiction), shall meet their requirements, shall bear their label wherever standards have been established and label service is regularly furnished by that agency, and shall be marked for intended use.

1.3 EXISTING CONDITIONS

- A. The Contractor shall carefully examine the site and existing buildings, compare them with Drawings and Specifications, and shall have satisfied himself as to the conditions to be encountered during the performance of the work. No subsequent allowance shall be made on his behalf for any additional expense he may incur due

to failure or neglect of Contractor to examine site and to include existing conditions in bid.

- B. Any work done as an addition, expansion, or remodel of an existing system shall be compatible with that system.
- C. The Contractor shall examine all record drawings made available by the Owner to locate existing underground systems, utilities, conduits, and pipes prior to installing the electrical distribution system. The Contractor shall also examine the site for possible locations of sprinkler pipes. Any damage done to the existing systems during the course of the electrical work, whose locations could be reasonably determined, shall be repaired to the satisfaction of the Owner and the utility or agency involved, at the expense of the Contractor.

1.4 CONDUCT OF THE WORK

- A. The Contractor shall maintain on the job a competent foreman or a superintendent at all times to superintend the Work.

1.5 INTERPRETATION OF DRAWINGS AND SPECIFICATIONS

- A. The Engineer's decision will be final on interpretation of the Drawings and Specifications. Whenever the words "AS MAY BE DIRECTED", "SUITABLE", or "APPROVED EQUAL", or other words of similar intent and meaning are used, implying that judgment is to be exercised, it is understood that it is in reference to the judgement of the Engineer.

1.6 SUBMITTALS

- A. See Specification Section 01 3300, SUBMITTAL PROCEDURES, for additional information and requirements.
- B. Shop Drawings and Product Data Submittals
 - 1. In addition to the provisions of Specification Section 01 3300, SUBMITTAL PROCEDURES, all Shop Drawings and Product Data shall comply with the following requirements:
 - a. The Contractor shall submit for review, complete sets of Shop Drawings and Product Data brochures for materials and equipment as required by each section of the Specifications.
 - b. All Shop Drawings and Product Data shall be submitted at one time in a neat and orderly fashion in a suitable binder with a Title Sheet including Project, Engineer and Contractor, Table of Contents, and indexed tabs dividing each group of materials or item of equipment. The Specification paragraph number for which they are proposed shall identify all items. The mark number as indicated on Drawings shall also identify all equipment and fixtures.

- c. Shop Drawings and Product Data submittal shall include manufacturer's name and catalog numbers, dimensions, loads, and all other characteristics and accessories as listed in the Specifications or on the Drawings. All loads, characteristics, and accessories called for in the Specifications or on the Drawings shall be highlighted, circled or underlined on the Shop Drawings and Product Data. Descriptive literature shall be current factory brochures and submittal sheets.
- d. FAX submittals are not acceptable.
- e. Material or equipment shall not be ordered or installed until the Engineer processes the written review. Any item omitted from the submittal shall be provided as specified without substitution.
- f. Prior to submission of the Shop Drawings and Project Data, Contractor shall review and certify that they meet the requirements of the Contract Documents.
- g. A minimum period of two weeks, exclusive of transmittal time, will be required each time Shop Drawings and/or Product Data are submitted or resubmitted for review. The Contractor shall consider this time when scheduling a submittal date.

C. Submittal Review

- 1. Submittals will be reviewed for general conformance with the design concept, but this review does not guarantee quantity shown, nor does it supersede the responsibility of the Contractor to provide all materials, equipment and installation in accordance with the Drawings and Specifications.
- 2. The Contractor shall agree that Shop Drawings and Product Data submittals processed by the Engineer are not Change Orders and that the purpose of Shop Drawings and Product Data submittals by the Contractor is to demonstrate to the Engineer that the Contractor understands the design concept. The Contractor demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods he intends to use.
- 3. It shall be clearly understood that the noting of some errors, but the overlooking of others, does not grant the Contractor permission to proceed in error or in conflict with Contract Documents. The Contractor shall agree that if deviations, discrepancies or conflicts between Shop Drawings and Design Drawings and Specifications are discovered either prior to or after Shop Drawing submittals are processed by the Engineer, the Design Drawings and Specifications shall control and shall be followed.
- 4. If a resubmittal is required, submit a complete copy of the Engineer's review letter requiring such with the resubmittal.

D. Substitutions

- 1. See Specification Section 01 2500, SUBSTITUTION PROCEDURES, for additional information and requirements.

2. In addition to the provisions of Specification Section 01 2500, SUBSTITUTION PROCEDURES, Substitutions shall comply with the following requirements:
 - a. Manufacturers, model numbers and other pertinent information listed in the Specifications or on the Drawings are intended to establish minimum standards of performance, function and quality. Unless otherwise noted, the Contractor may submit equivalent compatible UL-listed equipment from other manufacturers for review, as long as the minimum standards are met.
 - b. Calculations and other detailed data indicating how the item was selected shall be included for items that are not specified. Data must be complete enough to permit detailed comparison of every significant feature, function, performance, and quality characteristic that is specified, scheduled or detailed. The comparison must prove that the substituted item equals or exceeds the requirements of the specified item.
 - c. The Contractor shall assume full responsibility that substituted items or procedures will meet the Specification and job requirements and shall be responsible for the cost of redesign and modifications to the work caused by these items.
 - d. At the Engineer's request, the Contractor shall furnish locations where equipment similar to the substituted equipment is installed and operating along with the user's phone numbers and contact person. Satisfactory operation and service history will be considered in the acceptance or rejection of the proposed substitution.

E. Record Drawings

1. See Specification Section 01 7700, CONTRACT CLOSEOUT, for additional information and requirements.
2. In addition to the provisions of Specification Section 01 7700, CONTRACT CLOSEOUT, Record Drawings shall comply with the following requirements:
 - a. At the beginning of the Project, one print of each applicable Drawing will be issued to the Contractor specifically for use in preparing Record Drawings. As the work progresses, the Contractor shall maintain a record of all deviations in the work from that indicated on the Drawings. Final locations of all underground work shall be recorded by depth from finished grade and by offset distance from permanent surface structures, e.g. building, curbs, walks. The original Drawings will be made available to the Contractor, from which he shall have made, a set of reproducible Drawings. The Contractor shall then transfer the changes, notations, etc. from the marked-up prints to the reproducible Drawings. The Record Drawings (marked-up prints and reproducibles) shall be submitted to the Engineer for review, after first securing the Inspector's verification by signature.

F. Operations and Maintenance Instructions

1. See Specification Section 01 7700, CONTRACT CLOSEOUT, for additional information and requirements.
2. In addition to the provisions of Specification Section 01 7700, CONTRACT CLOSEOUT, Operations and Maintenance Instructions shall comply with the following requirements:
 - a. Three copies of Operation and Maintenance Instructions and Wiring Diagrams for all equipment shall be submitted to the Engineer. All instructions shall be clearly identified by marking them with the same designation as the equipment item to which they apply (e.g. UPS-1). All Wiring Diagrams shall agree with reviewed Shop Drawings and indicate the exact field installation.
 - b. All instructions shall be submitted at the same time and shall be bound in a suitable binder with tabs dividing each type of equipment (e.g. MCC, UPS, etc.). Each binder shall be labeled indicating "Operating and Maintenance Instructions, Project Title, Contractor, Date" and shall have a Table of Contents listing all items included.
 - c. The Contractor shall verbally instruct the Owner's maintenance staff in the operation and maintenance of all equipment and systems. The Engineer's office shall be notified 48 hours prior to this meeting.
 - d. The Contractor shall prepare a letter indicating that all Operation and Maintenance Instructions (printed and verbal) have been given to the Owner, to the Owner's satisfaction. This letter shall be acknowledged (signed) by the Owner and submitted to the Engineer.

1.7 COORDINATION

- A. Electrical Drawings are essentially diagrammatic, unless specifically dimensioned. Some work may be shown offset for clarity. The actual locations of all materials, conduits, fixtures, supports, etc. shall be carefully planned prior to installation of any work in order to avoid all interferences with each other, or with architectural, civil, mechanical, plumbing, structural or other elements.
- B. While the size and location of equipment are shown to scale wherever possible, all dimensions and conduit/conductor data shall be verified in the field.
- C. Where the work requires connections to be made to equipment furnished and set in place by others, the Contractor shall obtain exact rough-in dimensions from the manufacturer of such equipment and he shall install the connections in a neat and workmanlike manner.
- D. If discrepancies are discovered between Drawings and Specifications requirements, the more stringent requirement shall apply.
- E. All conflicts shall be called to the attention of the Architect and the Engineer prior to the installation of any work or the ordering of any equipment.

- F. No work shall be prefabricated or installed prior to this coordination. No additional compensation will be considered to the Contractor for any prefabrication or installation performed prior to this coordination.

1.8 SCHEDULING

- A. All work shall be scheduled subject to the review of the Architect, Engineer and the Owner. No work shall interfere with the operation of the existing facilities on or adjacent to the site. The Contractor shall have at all times, as conditions permit, a sufficient force of workmen and quantity of materials to install the work for which contracted, as rapidly as possible consistent with good work, and shall cause no delay to other Contractors engaged upon this project or to the Owner.

1.9 WARRANTY

- A. See Specification Section 01 7700, CONTRACT CLOSEOUT, for additional information and requirements.
- B. Guarantee shall be in accordance with the General Conditions. These Specifications may extend the period of the guarantee for certain items. Where such extension are called for, or where items are normally provided with guarantee periods in excess of that called for in the General Conditions, the Certificate of Guarantee shall be furnished to the Owner through the Engineer.
- C. Contractor shall deliver to the Owner a written guarantee on all workmanship, materials and equipment for a period of one (1) year from the date of acceptance by the Owner. Any work found to be faulty during that period of time shall be corrected at once, upon written notification, at the expense of the Contractor. This shall include repair or replacement of the premises that may be damaged as a result of faulty work and materials furnished.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Materials and equipment shall be new unless otherwise noted.
- B. Materials and equipment of a given type shall be by the same manufacturer.
- C. Materials and equipment shall be covered or otherwise protected during construction as required to maintain the material and equipment in new factory condition until project acceptance. Upon completion of work and prior to final inspection, Contractor shall thoroughly clean all exposed fixtures, trim and equipment, and shall leave the entire installation in neat, clean, and useable condition. Materials and equipment shall be free of dents, scratches, marks, shipping tags, and all defacing features at time of project acceptance.

- D. The Contractor shall order materials and equipment in a timely manner to prevent any delay in the construction schedule, and he shall bear any penalty by vendors to meet schedules.
- E. Verify all dimensional information to ensure proper clearance for installation of equipment. Check all materials and equipment after arrival on the jobsite and verify compliance with the Contract Documents.

PART 3 - EXECUTION

3.1 DEMOLITION

- A. The Contractor shall protect existing electrical equipment and installations that are not indicated to be removed. If damaged or disturbed in the course of the Work, remove damaged portions and install new products of equal capacity, quality, and functionality.
- B. Exposed electrical equipment and installations, indicated to be demolished, shall be removed in their entirety.
- C. Buried raceway and wiring, indicated to be abandoned in place, shall be cut 2 inches below the surface of adjacent construction and removed in its entirety. Raceways abandoned in place shall be capped and disturbed surfaces shall be patched to match existing finish.
- D. Demolished material shall be removed from Project site.
- E. Components indicated for relocation shall be removed, stored, cleaned, reinstalled, reconnected, and made operational.

3.2 CUTTING AND PATCHING

- A. The Contractor shall perform all cutting and drilling, or other work, required to provide openings in walls, ceilings, floors, footings, foundations or other structures necessary to accomplish work under this Specification Division. The cutting shall be performed by skilled mechanics of the trades involved.
- B. Cutting or coring shall not impair the strength of the structure. Any damage resulting from this work shall be repaired at the Contractor's expense to the satisfaction of the Architect.
- C. Wherever possible, work shall be done in a concealed and neat workmanlike manner requiring the least amount of cutting of studs, plates and woodwork. Such cutting or notching is allowed only after consultation with and by permission of the Engineer.
- D. The Contractor shall repair and refinish disturbed finish materials and other surfaces to accurately match adjacent undisturbed new or existing structures and surfaces and shall install new fireproofing where existing fire-stopping has been disturbed.

The repair and refinishing of materials and other surfaces shall be by skilled mechanics of the trades involved.

- E. All cuts are to be clean with no chipping. Where chipping occurs as a result of work in a cut area, a new clean cut shall be made immediately prior to patching.

3.3 CLEANING AND PROTECTION

- A. The Contractor shall, progressively and at completion of the job, thoroughly clean all of his work including outlets, fittings, and devices, and inspect exposed finishes. The Contractor shall remove all burrs, dirt, grease, paint spots, stains, labels, tags, rust, foreign material, and construction debris resulting from his work.
- B. The Contractor shall protect equipment and installations and maintain conditions to ensure that coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

END OF SECTION 26 0050

SECTION 26 0100
BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections shall form a part of this Section, with the same force and effect as though repeated here.

PART 2 - PRODUCTS

2.1 RACEWAYS AND FITTINGS

- A. Galvanized rigid steel conduit (GRC) shall meet ANSI C80.1, and be heavy wall, hot dipped galvanized inside and out, with threaded ends, for use with threaded type fittings.
- B. Galvanized intermediate metallic conduit (IMC) shall meet ANSI C80.6, be zinc-coated steel and have threaded fittings.
- C. Galvanized electrical metallic tubing (EMT) shall meet ANSI C80.3, and be continuous, seamless steel tubing, galvanized or sherardized on exterior, coated on interior with smooth hard finish of lacquer, varnish or enamel, with steel setscrew, steel compression or die-cast compression type fittings. Provide concrete type fittings where required or water-tight compression fittings for wet locations.
- D. Rigid non-metallic conduit (RNC) shall meet NEMA TC 2, be Schedule 40 PVC, suitable for 90°C, with solvent cemented type NEMA TC3 fittings.
- E. Flexible metallic conduit (FMC) shall be single strip, continuous, flexible interlocked double-wrapped steel, hot dip galvanized inside and out forming smooth internal wiring channel, with steel, compression type fittings.
- F. Liquid-tight flexible metallic conduit (LFMC) shall be same as FMC except with inert sunlight-resistant, mineral-oil-resistant watertight plastic outer jacket. Fittings shall be cast malleable iron body and gland nut, cadmium plated with one-piece brass grounding bushings threaded to interior of conduit. Spiral molded vinyl-sealing ring between gland nut and bushing and nylon-insulated throat.
- G. All raceway fittings shall be specifically designed for the raceway type with which used.

2.2 CONDUCTORS

- A. All conductors shall be delivered to the site in their original unbroken packages, plainly marked or tagged with UL labels, size, type of wire, type of insulation, name of the manufacturing company and trade name of the wire.
- B. All conductors shall be minimum of 98% conductivity soft drawn copper. Conductors #8 AWG and larger shall be stranded type "THWN/THHN", 600 Volt insulation. Conductors #10 AWG and smaller shall be solid copper "THWN/THHN", 600 Volt insulation.
- C. Insulation shall be Thermoplastic Type rated at 75 degrees C. minimum.

2.3 PULL BOXES AND WIREWAYS

- A. Pullboxes and Enclosures for outdoor use shall be NEMA 250, Type 3R or Type 4, unless otherwise noted.
- B. Pullboxes and Enclosures for indoor use shall be NEMA 250, Type 1, unless otherwise noted.
- C. Wireways shall be constructed in accordance with UL 870 for wireways, auxiliary gutters and associated fittings. Every component including lengths, connectors and fittings shall be UL Listed.
- D. Wireways and auxiliary gutters shall have continuous removable cover secured with screws and keyhole slots. Hinged cover shall be provided where installed above suspended ceiling.
- E. Fabricated sheet steel pull boxes shall be installed only in dry, protected locations and shall be furnished with knockouts and removable screw cover. Box shall be finished with one coat of zinc chromate and a coat of primer sealer and where exposed to public view shall be painted to match the surrounding surface.
- F. Weatherproof sheet steel pull boxes shall be fabricated of code gauge galvanized sheet steel with two coats of rust resistant finish and shall be furnished with gasket and made completely weathertight.

2.4 DISCONNECTING DEVICES

- A. Disconnecting devices shall be provided as shown and/or as required by CEC.
- B. Motor-rated switches shall be toggle-type, quick make-quick break, rated 2 HP, 250 VAC, with number of poles as required. They shall be equipped with overload heaters rated for overload protection of loads controlled.
- C. Motor-rated switches shall be flush-mounted adjacent to load controlled. Where flush mounting is not possible, switches shall be surface mounted in NEMA enclosure suitable for environment in which installed.
- D. Disconnect switches shall be 250V or 600V class, rated heavy-duty, horsepower rated, quick-make, quick-break, dead-front type and provided with proper number of poles.

- E. Disconnect Switches shall be self contained in a NEMA 1 gasketed enclosure (NEMA 3R, where installed outdoors) and externally operable from the front.
- F. Fusible disconnect switches shall be equipped with rejection type clips suitable for UL Class R fuses up to 600A and suitable for UL Class L fuses above 600A. Fuse interrupting rating shall be 200,000 RMS symmetrical amperes.
- G. Circuit breakers utilized as disconnecting devices shall comply with the requirements stated in other articles of this section and CEC.

2.5 FUSES

- A. Subject to compliance with requirements, provide products by one of the following manufacturers:
 - 1. Bussman
 - 2. Gould Shawmut
 - 3. Littlefuse.
- B. Fuses 600 amperes and below shall be UL Class RK1, 200,000 RMS symmetrical amperes interrupting rating.
- C. Fuses 601 amperes through 4000 amperes shall be UL Class L, 200,000 RMS symmetrical amperes interrupting rating.

2.6 SUPPORTING DEVICES

- A. Supporting devices shall be constructed of cold-formed steel, with a corrosion-resistant coating acceptable to authorities having jurisdiction.
- B. Metal items for use outdoors or in damp locations shall be hot-dipped galvanized steel.
- C. Slotted-steel channel supports shall have flanged edges turned toward the web, and 9/16-inch diameter slotted holes at a maximum of 2 inches on center, in the web.
 - 1. Channel thickness shall be selected to suit structural loading.
 - 2. Fittings and accessories shall be products of the same manufacturer as the channel supports.
- D. Raceway and cable supports shall be manufactured clevis hangers, riser clamps, straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring-steel clamps or click-type hangers.
- E. Pipe sleeves shall be ASTM A 53, Type E, Grade A, Schedule 40, galvanized steel, with plain ends.
- F. Cable supports for vertical conduit shall be a factory-fabricated assembly consisting of threaded body and insulating wedging plug for non-armored electrical

cables in riser conduits. Plugs shall have number and size of conductor gripping holes as required to suit individual risers. Body shall be constructed of malleable-iron casting with hot-dip galvanized finish.

- G. Concrete anchors shall be steel bolts with expansion anchors requiring a drilled hole. Powder driven anchors are not acceptable.
- H. Toggle bolts shall be all-steel springhead type.

2.7 ELECTRICAL IDENTIFICATION

- A. Identification devices shall be a single type of product for each application category. Colors shall be as prescribed by ANSI A13.1, CEC, and these Specifications.
- B. Raceway and cable labels shall comply with ANSI A13.1, Table 3, for minimum size of letters for legend and minimum length of color field for each raceway and cable size.
 - 1. Pre-tensioned, wraparound plastic sleeves shall be a flexible, preprinted, color-coded, acrylic band sized to suit the diameter of the item it identifies.
 - 2. Preprinted, flexible, self-adhesive, vinyl labels shall have a legend, overlaminated with a clear, weather- and chemical-resistant coating.
 - 3. Color shall be black letters on orange background.
 - 4. Legend shall indicate voltage.
- C. Self-adhesive colored marking tape for raceways, wires and cables shall be vinyl tape, not less than 1 inch wide by 3 mils thick.
- D. Underground Warning Tape shall be vinyl tape, compounded for permanent direct-burial service, not less than 6 inches wide by 4 mils thick, embedded with a continuous metallic strip or core, brightly-colored, continuously-printed with a legend that indicates the type of underground line.
- E. Tape markers for wire shall be vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.
- F. Color-coding cable ties shall be made of Type 6/6 nylon, be self-locking type and of colors to suit coding scheme.
- G. Engraved plastic labels, signs and instruction plates shall be made from black (or red as noted) Bakelite laminate engraving stock with a white core, punched or drilled for mechanical fasteners. It shall have a minimum thickness of 1/16-inch for signs up to 20 sq. in. and a minimum thickness of 1/8-inch for larger sizes.
- H. Interior Warning and Caution signs shall comply with 29 CFR, Chapter XVII, Part 1910.145 and shall be preprinted, aluminum, baked-enamel-finish signs, punched or drilled for mechanical fasteners, with colors, legend, and size appropriate to the application.

- I. Exterior Warning and Caution signs shall comply with 29 CFR, Chapter XVII, Part 1910.145 and shall be weather-resistant, non-fading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch, galvanized-steel backing, with colors, legend, and size appropriate to the application. They shall be equipped with 1/4-inch grommets in each corner for mounting.
- J. Fasteners for nameplates and signs shall be self-tapping, stainless-steel screws or No. 10/32 stainless-steel machine screws with nuts and flat and lock washers.

2.8 TOUCHUP PAINT

- A. Touch-up paint shall be equipment manufacturer's paint selected to match installed equipment finish.
- B. Touch-up paint on galvanized surfaces shall be zinc-rich paint recommended by item manufacturer.

PART 3 - EXECUTION

3.1 ELECTRICAL INSTALLATION

- A. All material, equipment, devices, etc., shall be installed in accordance with the recommendations of the manufacturer of the particular item. The Contractor shall be responsible for all installations contrary to the manufacturer's recommendations. The Contractor shall make all necessary changes and revisions to achieve such compliance. Manufacturer's installation instructions shall be delivered to and maintained at the job site throughout the construction of the project.
- B. The layout and installation of electrical work shall be coordinated with the overall construction schedule to prevent delay in completion of the project.
- C. Dimensions and information regarding accurate locations of equipment and structural limitations and finish shall be verified with other sections.
- D. The drawings do not show all raceway, wiring, offsets, bends, special fittings, junction or pull boxes necessary to meet job conditions. Items not shown as indicated, where are clearly necessary for proper operation or installation of systems shown, shall be provided as required, at no increase in contract price.
- E. Materials and Components shall be installed level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.
- F. Electrical equipment, outlets, junctions and pull boxes shall be installed in accessible locations, avoiding obstructions, preserving maximum headroom, and keeping openings and passageways clear.
- G. Equipment shall be installed to facilitate service, maintenance, and repair or replacement of components. It shall be connected for ease of disconnecting, with minimum interference with other installations. Minor adjustments in the locations of

equipment shall be made where necessary providing such adjustments do not adversely affect function of the equipment. Major adjustments for the location of equipment shall be previously approved and detailed on the Record Drawings.

- H. Right of Way shall be given to raceways and piping systems installed at a required slope.

3.2 RACEWAY APPLICATION

- A. Galvanized Rigid Steel Conduit (GRC) may be used in all locations. Where installed in direct contact with earth, conduit shall be wrapped with two layers of half-lapped 10-mil PVC tape for a total thickness of 40-mil or have a factory applied 40-mil PVC coating.
- B. Galvanized Rigid Steel Conduit (GRC) shall be used where exposed to physical damage, indoors where exposed to moisture, exposed outdoor installations, in systems higher than 600 volts, and where required by code.
- C. Galvanized Intermediate Metallic Conduit (IMC) may be used in indoor locations not in direct contact with earth.
- D. Galvanized Electrical Metallic Tubing (EMT) may be used in dry indoor locations according to the following criteria:
 - 1. It is not subject to physical damage.
 - 2. It is not in direct contact with earth.
 - 3. It is not in concrete slabs.
 - 4. It is not in a hazardous area.
- E. Galvanized Electrical Metallic Tubing (EMT) shall be used for general-purpose feeders and branch circuits.
- F. Rigid Non-Metallic Conduit (RNC) (e.g. SCH 40 PVC) may be used underground or below concrete slabs on grade.
- G. Liquid-tight Flexible Metallic Conduit (LFMC) may be used in all locations to make final connections to motors, transformers, or other mechanical equipment (not to exceed 24 inches in length) or lighting fixtures (not to exceed 72 inches in length). Where specifically approved by the Engineer, LFMC may be used to facilitate wiring in tight locations or in other conditions that make the use of other conduit impracticable.
- H. Flexible Metallic Conduit (FMC) may be used in dry locations to make final connections to motors, transformers, or other mechanical equipment (not to exceed 24 inches in length) or lighting fixtures (not to exceed 72 inches in length). Where specifically approved by the Engineer, FMC may be used to facilitate wiring in tight locations or in other conditions that make the use of other conduit impracticable.

3.3 RACEWAY INSTALLATION

A. General

1. Expansion joints shall be provided at building expansion joints or as required due to length of run or difference in temperatures.
2. All fittings that are exposed or in damp areas shall have sealing glands and proper gasket.
3. In general, all conduits shall be sloping to drain. Bends that place a trap in a conduit shall be avoided. Provided drip fitting as required. Dux-Seal high ends of all underground raceways.
4. All conduit runs shall be mechanically and electrically continuous from outlet to outlet. Conduit size or type shall not be changed between outlets.
5. All empty raceways shall be equipped with pull lines, capped and labeled. Pull lines shall be 3/16" polypropylene, No. 14 AWG zinc-coated steel or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 24 inches of slack with identification tag at each end of the pull wire.
6. Minimum size of any conduit for lighting, power and signal shall be 3/4" conduit unless shown otherwise.
7. Use temporary raceway caps to prevent foreign matter from entering. Immediately prior to installation of conductors, conduit shall be blown and swept free of foreign materials. All conduit stubs for future, both above and below grade, shall be capped. Run conduits for spare panelboard circuits to attic or accessible spaces.
8. Make conduit bends and offsets so ID is not reduced. Keep legs of bends in the same plane and straight legs of offsets parallel, unless otherwise indicated.
9. Make bends in exposed parallel or banked runs from same centerline to make bends parallel. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for exposed parallel raceways.
10. Install raceways and cables at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Locate horizontal raceway runs above water and steam piping.
11. Conduits shall be securely fastened to building structure at intervals not greater than ten feet.
12. Conduit shall be square cut and reamed if required to full size, with thread full cut and true.
13. Conduits shall be jointed by approved couplings with ends of conduits tightly butted. Non-insulating compound shall be used in making up joints below grade or inside on grade to insure a watertight system.
14. Conduit connections to outlet boxes or cabinets shall be made with approved connectors, using locknuts and insulated throat bushings.
15. Complete raceway installation before starting conductor installation.

16. Contractor shall provide rubber grommets to fasten galvanized conduit to exterior structures made of dissimilar metals at all exterior locations to prevent galvanic corrosion.
17. Contractor shall provide rubber grommets to fasten galvanized conduit to supports which are also used by other systems utilizing piping of dissimilar metals to prevent galvanic corrosion.

B. Interior

1. Conceal raceways and cables, unless otherwise indicated, within finished walls, ceilings, and floors.
2. All concealed conduits shall be installed in as direct a line as possible between outlets. No more than four quarter bends, or their equivalent, will be allowed between outlets. Feeder conduits shall follow arrangement shown on plans unless a change is authorized. Branch circuit conduits shall, in general, follow arrangement as shown as far as structural conditions permit. All exposed runs shall parallel buildings, walls, or partitions, and be supported on Kindorf Hangers to meet Title 24, Part 6, CAC.

C. Exterior

1. All exterior conduit, starting from minimum 24" below grade up to 10 feet above grade, shall be galvanized rigid steel conduit, UON.
2. No Rigid Non-Metallic Conduit (RNC) shall be installed above grade.

D. Flexible Conduit

1. LFMC or FMC shall be used to connect motors and equipment subject to vibration, noise transmission, or movement to junction boxes, with a maximum length of 24-inches.
2. Install separate ground conductor across flexible connections.
3. Flexible conduits shall be independently suspended.

E. HVAC Curb Penetrations

1. Where possible, electrical and/or control connections to curb-mounted HVAC Equipment shall be made under the HVAC Equipment, and within the confines of the curb, with NO penetration of the curb required.
2. Where a curb penetration IS required to make electrical and/or control connections to curb-mounted HVAC Equipment, those penetrations shall be sealed at both the interior AND exterior penetration of the curb with the Chem Link, E-Curb, Waterproof Seal System, or equal.

3.4 CONDUCTOR APPLICATION

- A. Feeders and branch circuits shall be Type THHN/THWN insulated conductors in raceway.

- B. Minimum conductor size shall be #12 for power and lighting, #14 for 120V control circuits and #18 for 24V control circuits.
- C. Remote control, signaling and power-limited circuits shall be Type THHN/THWN insulated conductors in raceway for Classes 1, 2, and 3, unless otherwise indicated.

3.5 CONDUCTOR INSTALLATION

- A. Conductors shall be continuous from outlet to outlet, no splices shall be made except within outlet or junction boxes.
- B. Wiring at outlets shall be installed with at least 12 inches of slack conductor at each outlet.
- C. Outlet and component connections shall be made to wiring systems and to ground. Electrical connectors and terminals shall be tightened according to manufacturer's published torque-tightening values. Torque values specified in UL 486A shall be used where manufacturer's torque values are not indicated.
- D. Wire in panels, cabinets, pull boxes, and wiring gutters shall be squared, labeled, and neatly grouped with cable ties and fanned out to the terminals.
- E. All branch circuits, fixture wiring joints, splices, and taps for conductors #10 and smaller shall be made with 3M "Scotchlock" connectors, or approved equal.
- F. All branch circuits, fixture wiring joints, splices, and taps for conductors #8 and larger shall be made with two-bolt type solderless connectors or T & B "color keyed" compression lugs.
- G. Bolt-type solderless connectors shall be torqued with a torque wrench according to the manufacturer's recommendations, and then retightened after 24-48 hours before taping. Owners' inspector shall be informed of this procedure during the waiting period and shall witness the act of retightening.
- H. Connectors and lugs for terminating stranded conductors #8 and larger shall be machine crimp compression type.
- I. All splices shall be taped with Scotch #88 plastic electrical tape with "Scotch Fill" where necessary for a smooth joint. Scotch #27 or #2520 shall be used for other than normal temperatures or conditions. All connections and splices shall be electrically perfect and in strict accordance with all code requirements.
- J. No splices shall be made below grade in a manhole or pullholes without Engineer's written approval, and then shall be encapsulated with 3M potting kits per 3M Specifications.

3.6 WIREWAY AND AUXILIARY GUTTER APPLICATION

- A. Wireways and auxiliary gutters shall be used above and below panelboards, lighting relay cabinets, and terminal cabinets to accommodate large concentrations of wires.

3.7 PULL BOXES AND WIREWAYS:

- A. Boxes shall be installed square and plumb. An engraved nameplate shall be installed on each box indicating its function. Nameplate shall be installed on the exterior of each box in unfinished areas and on the interior of each box in finished areas.
- B. Wireways shall be installed with strip-type connectors with self-retained mounting screws. Hangers with two piece, hook together features shall be used to permit preassembly of wireway and hanger bottom plate before hanging on a preinstalled upper bracket.
- C. Pull and junction boxes shall be installed as shown to ease the pulling of wire and to comply with CEC requirements.

3.8 WIRING DEVICES AND MATERIALS

- A. Outlets shall be mounted at 18" minimum above finished floor unless otherwise noted.
- B. The locations of outlets shown on drawings shall be located with respect to work of others and to be symmetrical with room layout.
- C. Outlets in architectural patterned surfaces such as tile and finish panels shall be centered on intersections of four panels or in exact center of panels, unless otherwise shown on architectural plans or directed by Architect.
- D. Outlet boxes for concealed work shall be one-piece steel knock out type with zinc coating. Boxes shall not be smaller than 4" square nominal size, unless otherwise indicated. Extension rings, plaster rings, and covers shall be provided as necessary for flush finish.
- E. The Contractor shall inform himself of wall thickness throughout the building and shall provide outlet boxes of suitable depth that can be flush mounted and yet will be deep enough to contain the particular apparatus involved. Location of exposed pull or junction boxes will be subject to the Architect's approval.
- F. Outlet boxes on opposite sides of walls shall not be placed back-to-back, nor shall "through" boxes be employed (except where specifically permitted on the drawings by note).
- G. Switches shall be mounted 48" to top of device box above finished floor unless otherwise noted.
- H. Where more than one switch occurs at the same location, use multiple gang outlet boxes covered by a single plate; provide box partitions as required by the C.E.C.
- I. Bar hangers shall be used to support outlet boxes in stud or furred partitions and ceilings. Attachment screws, devices, etc., shall be of the proper type to secure boxes to metal studs complemented by expansion shields to concrete and masonry.

- J. All outlet boxes and particularly those supporting fixtures shall be securely anchored in place in an approved manner. Support outlet boxes and fixtures in acoustic ceiling areas from building structures, not from acoustic ceilings. All lighting fixture outlets shall be coordinated with mechanical, architectural, or other equipment to eliminate conflicts and provide a workable, neat installation.
- K. Approved knock out holes shall be provided. Outlet boxes from which light fixtures will be suspended shall be equipped with 3/8" fixture studs fastened through from back of box.
- L. Surface boxes of the cast metal threaded hub type with suitable gasketed covers shall be used for exposed conduit runs less than 5' above a finished floor or where waterproof boxes are required.
- M. Floor boxes shall be adjustable, brass trimmed with carpet flanges where carpet is indicated on architectural drawings.
- N. Set floor boxes level and trim after installation to fit flush to finished floor surface.
- O. Masonry boxes shall have conduit entrances to rear of box with depth as required to clear masonry.
- P. Boxes shall be sized for number of conductors entering box.
- Q. Wiring devices shall be securely fastened to the outlet box. Where the outlet box covers are back from the finished walls, the device shall be built out with washers so that it is rigidly held in place to the box. Metal extenders shall be provided in flammable construction per CEC.
- R. All device screw slots shall be left in a vertical orientation.
- S. Connect wiring device grounding terminal to branch-circuit equipment grounding conductor and to outlet box with bonding jumper.
- T. Connect ground terminal of isolated-ground receptacles to isolated-ground conductor routed to designated isolated equipment ground terminal of electrical system.

3.9 DISCONNECT DEVICES

- A. Thoroughly examine site conditions for acceptance of disconnects switch installation to verify conformance with manufacturer and specification tolerances. Do not commence with installation until all conditions are made satisfactory.
- B. Coordinate locations of switches and equipment in the field to provide code required clearances in front of switches and to insure that switches are in sight of the controllers as described in CEC Article 430.
- C. Install disconnect switches where indicated on the Drawings.
- D. Install fuses in fusible disconnect switches.

- E. Include construction channel and mounting hardware as required to support disconnect switch.
- F. Provide engraved, machine screw retained nameplate on each disconnect switch.

3.10 SUPPORTING DEVICE APPLICATION

- A. Hot-dip galvanized materials or nonmetallic channel and angle system components shall be used in damp locations and outdoors.
- B. Steel materials shall be used in dry locations.
- C. Support clamps for PVC raceways shall be click-type clamp system.
- D. Strength of supports shall be adequate to carry present and future loads, times a safety factor of at least four with a minimum of 200-lb design load.

3.11 SUPPORT INSTALLATION

- A. Install support devices to securely and permanently fasten and support electrical components.
- B. Install individual and multiple raceway hangers and riser clamps to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assemblies and for securing hanger rods and conduits.
- C. Support parallel runs of horizontal raceways together on trapeze- or bracket-type hangers.
- D. Size supports for multiple raceway installations so capacity can be increased by a 25 percent minimum in the future.
- E. Support individual horizontal raceways with separate, malleable-iron pipe hangers or clamps.
- F. Install 1/4-inch diameter or larger threaded steel hanger rods, unless otherwise indicated.
- G. Spring-steel fasteners specifically designed for supporting single conduits or tubing may be used instead of malleable-iron hangers for 1-1/2-inch and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings and for fastening raceways to slotted channel and angle supports.
- H. Arrange supports in vertical runs so the weight of raceways and enclosed conductors is carried entirely by raceway supports, with no weight load on raceway terminals.
- I. Simultaneously install vertical conductor supports with conductors.
- J. Separately support cast boxes that are threaded to raceways and used for fixture support. Support sheet-metal boxes directly from the building structure or by

bar hangers. If bar hangers are used, attach bar to raceways on opposite sides of the box and support the raceway with an approved fastener not more than 24 inches from the box.

- K. Install metal channel racks for mounting cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices unless components are mounted directly to structural elements of adequate strength.
- L. Install sleeves for cable and raceway penetrations of concrete slabs and walls unless core-drilled holes are used. Install sleeves for cable and raceway penetrations of masonry and fire-rated gypsum walls and of all other fire-rated floor and wall assemblies. Install sleeves during erection of concrete and masonry walls.
- M. Securely fasten electrical items and their supports to the building structure, according to the following criteria, unless otherwise noted:
 - 1. Wood – wood screws or screw-type nails.
 - 2. Masonry – toggle bolts on hollow masonry units, expansion bolts on solid masonry units.
 - 3. New Concrete – concrete inserts with machine screws and bolts.
 - 4. Existing Concrete – expansion bolts.
 - 5. Steel – welded threaded studs or spring-tension clamps on steel. Field welding shall comply with AWS D1.1. Welding to steel structure may be used only for threaded studs, not for conduits, pipe straps, or other items.
 - 6. Light Steel – sheet-metal screws.
 - 7. Fasteners shall be selected so the load applied to each fastener does not exceed 25 percent of its proof-test load.

3.12 ELECTRICAL IDENTIFICATION

- A. Each conductor of every system shall be permanently tagged in each panelboard, pull box, J-box, etc., in compliance with the Occupational Safety and Health Administration (OSHA).
- B. Brady labels shall be used to identify terminals and destination of feeders, branch circuits, signal and control circuits, etc., at all terminations, junction boxes and pull boxes, and shall be coordinated with the nameplates in all boxes and equipment.
- C. All terminals in the switchboards, panels, relays, switches, devices, starter terminals, etc., shall have Brady labels for identification to identify both ends of all wiring.
- D. The Contractor shall furnish and install 1" x 3" x 3/32" thick laminated black Bakelite nameplates with a white core (unless specifically shown as red) engraved to produce white letters on black background for all items of electrical equipment, including 2-pole and 3-pole circuit breakers, panelboards, starters, relays, time switches and disconnect switches. They shall screw them in place. Adhesively applied nameplates shall not be used.

- E. All devices shall have their branch circuit identified on the back side of device plate with a permanent type black marker, i.e. CT A-21. Identify panelboard and circuit number from which receptacles are served. Use machine-printed, pressure-sensitive, abrasion-resistant label tape on face of plate and durable wire markers or tags within outlet boxes.
- F. Coordinate names, abbreviations, colors, and other designations used for electrical identification with corresponding designations indicated in the Contract Documents or required by codes and standards. Use consistent designations throughout Project.
- G. Panels having single-pole circuit breakers shall be provided with typed schedules mounted in welded metal holders behind plastic.
- H. Clean surfaces that are to receive self-adhesive identification products before applying.
- I. Where three or more switches are ganged, and elsewhere as indicated, identify each switch with approved legend engraved on wall plate.
- J. Tag and label circuits designated to be extended in the future. Identify source and circuit numbers in each cabinet, pull and junction box, and outlet box. Color-coding may be used for voltage and phase identification.
- K. All power conductors shall be identified in accordance with the following schedule:
 - 1. 120/208V, 3 Phase, 4 Wire System.
 - a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue.
 - d. Neutral: White.
 - e. Ground: Green
 - 2. 120/240V, 3 Phase, 4 Wire System.
 - a. Phase A: Black.
 - b. Phase B (Stinger): Orange.
 - c. Phase C: Blue.
 - d. Neutral: White
 - e. Ground: Green
 - 3. 277/480V, 3 Phase, 4 Wire System.
 - a. Phase A: Brown.
 - b. Phase B: Orange.
 - c. Phase C: Yellow.
 - d. Neutral: White with a colored stripe or gray.
 - e. Ground: Green.

3.13 REFINISHING AND TOUCHUP PAINTING

- A. The Contractor shall clean damaged and disturbed areas and apply primer, intermediate, and finish coats to suit the degree of damage at each location. He shall follow paint manufacturer's written instructions for surface preparation and for timing and application of successive coats.
- B. Damage to galvanized finishes shall be repaired with zinc-rich paint recommended by manufacturer.
- C. Damage to PVC or paint finishes shall be repaired with matching touchup coating recommended by manufacturer.
- D. See Section 09900, "Painting".

3.14 SYSTEM TESTING AND STARTUP

- A. Refer to Specification Section 26 9500 ELECTRICAL ACCEPTANCE TESTS for minimum required systems testing and startup.

END OF SECTION 26 0100

SECTION 26 9500
ELECTRICAL ACCEPTANCE TESTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section defines the Electrical Acceptance Tests and checks that shall be made on all electrical equipment and wiring to ensure compliance with all applicable Codes and Standards, and with the requirements of the Contract Documents.
- B. All electrical equipment testing and related costs shall be included in the Contractor's bid.

1.2 GENERAL REQUIREMENTS

- A. The Contractor shall test equipment of all kinds installed on this project to determine whether it fulfills the requirements of these Specifications. The Contractor shall furnish all labor necessary to adjust the operation of the apparatus and make the connections for the tests. After the tests have been completed, the Contractor shall restore all connections, apparatus, etc., to their original condition.
- B. Electrical systems, equipment and materials shall be tested prior to final acceptance of the work.

1.3 CODES AND STANDARDS

- A. 2022 California Electrical Code (CEC).
- B. National Electrical Manufacturer's Association (NEMA).
- C. Manufacturer's Instructions and Maintenance Manual applicable to each particular apparatus.
- D. OSHA Rules and Regulation.
- E. National Electrical Testing Association (NETA) "Acceptance Testing Specifications".
- F. Procedures as directed by Engineer.

1.4 CARE AND PRECAUTIONS

- A. Contractor shall be responsible for any damage to equipment or material due to improper test procedures or test apparatus handling, and shall replace or restore to original condition, any damaged equipment or material.

- B. Contractor shall furnish and use safety devices such as rubber gloves and blankets, protective screens, barriers, and danger signs to adequately protect and warn all personnel in the vicinity of the tests.

1.5 EQUIPMENT TO BE TESTED BY CONTRACTOR

- A. Perform the visual inspections, manual operations and tests on systems and equipment as described in Part 3, "Execution".
- B. Power Cable
- C. Disconnect Switches
- D. Motors
- E. Control Cable

1.6 SUBMITTALS

- A. Submittals for this Section shall be made according to the Conditions of the Contract, Division 1 Specification Sections and Specification Section 26 6000.
- B. Test Reports
 - 1. Provide written test reports, signed and dated, for all tests prior to acceptance of the tested equipment by the Owner.
 - 2. All tests shall be recorded on the following forms:
 - a. 26 9500-1 MULTIPLE CONDUCTOR CABLE MEGGER TEST,
300V AND LESS
 - b. 26 9500-2 SINGLE & MULTIPLE CONDUCTOR POWER CABLE
MEGGER TEST, 600V AND LESS
 - 3. Submit certified reports of Independent Tests and Observations indicating and interpreting test results specified in Part 3 of this Section.
 - a. The Test Report shall include the following:
 - 1) Description of equipment tested.
 - 2) Description of test procedure.
 - 3) Calibration record for all testing devices used.
 - 4) Test results.
 - 5) Recommendations.
 - 6) Appendix, including all field test reports.

- b. Furnish six copies of completed report to the Electrical Engineer no later than ten days after test completion unless requested otherwise by Owner.
- c. Instrumentation-Traceability: The testing agency shall provide calibration labels for all relays and circuit breakers tested.
- d. Labels shall be self-adhesive and placed on covers or frames so as not to obscure nameplate, tap block or time dial. Label shall indicate date tested and firm name.

PART 2 - PRODUCTS

2.1 TESTING EQUIPMENT

- A. Furnish suitable electrical instruments including voltmeters, ammeters, wattmeters, tachometers and all other equipment necessary to perform tests specified.
- B. Make necessary openings in circuits for testing instruments and place and connect all instruments, equipment and devices necessary for the tests. Upon completion of tests, remove instruments and instrument connections and restore all circuits to permanent condition.

2.2 TESTING COORDINATION

- A. Coordinate activities and cooperate with others on the Project to ensure that systems are energized when required, when loads are applied, and that other requirements of this Section of the Specifications are carried out in a timely, coordinated basis.
- B. Conduct tests in the presence of the Architect/Engineer and the Construction Manager. Notify the Architect/Engineer and Construction Manager seven calendar days or more in advance when any test is to be performed, and do not start tests without the permission of the Architect/Engineer and Construction Manager.
- C. Make up no permanent connections until correct phase sequence of all equipment is determined.

PART 3 - EXECUTION

3.1 GENERAL

- A. The Contractor shall provide Acceptance Testing on the entire Electrical System.
- B. Acceptance Testing shall include Visual Inspections, Manual Operations, Electrical Tests, and Functional Testing.

- C. Whenever possible, all Visual Inspections, Manual Operations and Electrical Tests shall be made just prior to energizing the equipment or circuits, and shall be coordinated with the field schedule and field conditions.
- D. Test reports on megger, dielectric absorption and high potential tests shall include the ambient temperature and relative humidity existing at the time of the tests.
- E. Should any piece of apparatus or any material or work fail during any of these Tests, it shall be immediately removed and be replaced by perfect material by this Contractor at his expense and the portion of the work replaced be again tested by the Contractor.
- F. Before testing and energizing a system, all necessary precautions shall be taken to ensure the safety of personnel and equipment. All conductors and all electrical equipment shall be properly insulated and enclosed. All enclosures for conductors and equipment shall be properly grounded. Insulation resistance measurements must have been made and approved on all conductors and energized parts of electrical equipment.
 - 1. During actual testing, the Contractor shall:
 - a. Ensure that temporary power terminations are connected in such a manner that commercial power may be restored in forty-five minutes upon request.
 - b. Place temporary power cables out of the way in a safe manner that provides no hazard to personnel or equipment in the area.
 - c. Provide all special connections required.
 - d. Conduct all tests in presence of the representative except where advised this would not be necessary.
- G. The entire installation shall be free from short circuits and improper grounds. Test shall be made in the presence of the Architect, his Engineer or his representative. Panels and circuits shall be tested for grounds and shorts with mains disconnected from the feeder, branches connected, lamps removed or omitted from the sockets and all wall switches closed. Each individual circuit shall be tested at the panel with the equipment connected for proper operation
- H. The following minimum tests are required, but shall not be limited to this list. Tests will be supervised and witnessed by the Architect/Engineer and Construction Manager:
 - 1. Proper phase rotation.
 - 2. Short circuits.
 - 3. Improper grounds.
 - 4. Power and control electrical circuits for circuit continuity and function test.
- I. Furnish all personnel, labor, meters, instruments, cable, connections, equipment and apparatus necessary for making all tests.

- J. Check and test all switchboards, transformers, panelboards, feeders, power and control cables, communication system devices and wiring, and all connections to all equipment.
- K. After wires and cables are in place and connected to devices and equipment, the system shall be tested for short circuits, improper grounds, and other faults. If fault condition is present, the trouble shall be rectified and the wiring system shall be retested.
- L. The Architect/Engineer will conduct from time to time such tests as may be required to any part of the equipment to determine if it is installed in accordance with specifications. Extend to the Architect/Engineer all facilities to this end and furnish skilled or unskilled help required.
- M. All final tests shall be witnessed by the Architect/Engineer and Construction Manager and three copies of the verified test results shall be given to the Architect/Engineer and Construction Manager promptly upon completion of a test.
- N. Provide assistance to the various equipment manufacturers' field engineers as required in the testing and adjusting of the electrical power and control equipment. Cooperation shall be such that a minimum of time is required for equipment testing.
- O. A log shall be maintained for all tests. This log shall be certified before completion of the project, both as to test value and date of test. All major equipment such as the switchboard and panelboards shall be energized initially in the presence of the Architect/Engineer and Construction Manager.
- P. The Owner reserves the right to operate any system or equipment prior to final completion and acceptance of the work. Such preliminary operation shall not be construed as an acceptance of any work. Each piece of equipment and all of the systems shall be adjusted to insure proper functioning and shall be left in first class operating condition.

3.2 VISUAL INSPECTIONS

- A. Prior to Manual Operation and Electrical Testing, perform Visual Inspections to verify the following:
 - 1. The equipment is completely and properly installed.
 - 2. The equipment is free from damage and defects.
 - 3. Shipping blocks and restraints have been removed.
 - 4. Electrical terminations have been properly tightened.
 - 5. The equipment has been properly aligned.
 - 6. The equipment has been properly lubricated.
 - 7. The ventilation louvers are open and unobstructed.
 - 8. Voltages and phases have been properly identified.

9. Terminations in control panels have been properly identified.
10. The equipment is ready to be tested

3.3 MANUAL OPERATION

- A. Prior to any Electrical Testing, mechanical devices shall be exercised or rotated manually to verify that they operate properly and freely.

3.4 ELECTRICAL TESTS BY CONTRACTOR

- A. Molded Case Circuit Breakers rated less than 100A
 1. Circuit breakers will be operated manually several times to ensure smooth operation.
 2. Molded case will be inspected for cracks.
- B. Power Cable
 1. The 600-volt insulated wires and cables shall be factory tested prior to shipment in accordance with ICEA Standards for the insulation specified.
 2. Perform a continuity check and a 1,000 volt DC megger test on 600 volt power cables No. 6 AWG and larger.
 - a. The megger test shall be performed between each pair of conductors and from each conductor to ground.
 - b. The megger test shall be performed for 15 seconds or until the insulation resistance value stabilizes.
 - c. The insulation resistance between conductors and from each conductor to ground shall be 100 megohms minimum in one minute or less. In addition, the lowest insulation resistance value shall not differ from the highest value by more than 20 percent.
 3. Phase conductors, if shorted, grounded or at fault shall be removed, shall be replaced and the wiring system shall be retested.
- C. Disconnect Switches
 1. Check for cleanliness of contacts, operation, etc.
 2. Lubricate contacts and mechanical devices.
 3. Check fuse-clip tightness.
- D. Control Cable
 1. Perform a continuity check on control and instrumentation wiring.

3.5 FUNCTIONAL TESTING

- A. All automatic and manual functions shall be checked for proper operation.
- B. All indicating circuits, lights and alarms shall be tested for correct operation. Burned out indicators shall be re-lamped.
- C. Upon completion of the Work, place the entire installation in operation, test for proper function, and show systems and equipment to be free of defects.

END OF SECTION 26 9500

FORM 26 9500 - 1

MULTIPLE CONDUCTOR CABLE MEGGER TEST, 300 VOLTS & LESS

WIRING - SIGNAL & COMMUNICATION CABLE

Testing shall be performed before connecting the cables to the terminals at either end. Continuity of each

conductor shall be checked at this time. Each conductor shall be checked with a 500 volt megger to ground, with all other conductors in the cable and shield, grounded. The minimum acceptable megger resistance shall be 50 megohms for each conductor to ground.

PROJECT NAME _____

FEEDER NUMBER _____

LOCATION _____

CABLE SIZE _____

CABLE LENGTH _____

NO. OF
CONDUCTORS _____

INSULATION TYPE _____

MANUFACTURER _____

LINE VOLTAGE _____

TEMPERATURE _____

HUMIDITY _____

MEGGER TYPE _____

SERIAL NUMBER _____

TEST VOLTAGE _____

MULTIPLIER _____

REMARKS _____

CONDUCTOR NO.	MEGOHMS		CONTINUITY		CONDUCTOR NO.	MEGOHMS		CONTINUITY	
	C/C	C/S	PASS	FAIL		C/C	C/S	PASS	FAIL

TEST PERFORMED BY _____
Signature

Date

TEST WITNESSED BY _____
Signature

Date

FORM 26 9500 - 2

SINGLE & MULTIPLE CONDUCTOR POWER CABLE MEGGER TEST, 600 VOLTS & LESS

WIRING – FEEDER CIRCUITS

Testing shall be performed before connecting the cables to the terminals at either end. Continuity of each

conductor shall be checked at this time. Each conductor shall be checked with a 500 volt megger to ground, with all other conductors (including shield) in the conduit or cable grounded. The minimum acceptable megger resistance shall be 50 megohms for each conductor to ground.

PROJECT NAME _____

FEEDER NUMBER _____

LOCATION _____

CABLE SIZE _____

CABLE LENGTH _____

NO. OF
CONDUCTORS _____

INSULATION TYPE _____

MANUFACTURER _____

LINE VOLTAGE _____

TEMPERATURE _____

HUMIDITY _____

MEGGER TYPE _____

SERIAL NUMBER _____

TEST VOLTAGE _____

MULTIPLIER _____

REMARKS _____

Cable No	MEGOHMS Phase A	MEGOHMS Phase B	MEGOHMS Phase C

TEST PERFORMED BY _____
Signature

Date

TEST WITNESSED BY _____
Signature

Date

SECTION 26 9510
ELECTRICAL COMMISSIONING

PART 1 - GENERAL

1.1 SUMMARY

- A. Work included: Labor, materials, and equipment necessary to complete the start-up and commissioning of the electrical systems, including but not limited to:
 - 1. Grounding and bonding system.
 - 2. Building wire and cables.
 - 3. Motor controls.
 - 4. Fire alarm/life safety system.
- B. Related work: Consult all other Sections, determine the extent and character of related work and properly coordinate work specified herein with that specified elsewhere to produce a complete installation.
 - 1. Division 01: General Requirements
 - 2. Division 23: Mechanical Commissioning.
 - 3. Division 25: Energy Management and Control System.
- C. Perform commissioning of electrical systems as directed by the District's commissioning agent in accordance with the contract documents.
- D. Electrical commissioning requires the participation of all parties related to the Division 26 contract to ensure that systems are operating in a manner consistent with the contract documents. The parties shall consist of, but not be limited to the following:
 - 1. Electrical contractor.
 - 2. Special systems subcontractors or distributors.
 - 3. Independent testing agency.
 - 4. Factory-authorized service representatives.
- E. Additionally, there is participation required from parties outside of Division 26 contract to ensure that their systems are operating or monitoring in accordance with a sequence of operation consistent with the contract documents. The parties shall consist of, but not be limited to the following:
 - 1. HVAC specified under Division 23: For control and monitoring of fan and fire/smoke damper system via the fire alarm/life safety system per the sequence of operation.

- F. The commissioning responsibilities applicable to each of the parties indicated above are as follows:
1. One representative from each of the above parties shall attend a commissioning scope meeting and all other meetings necessary to facilitate the commissioning process.
 2. Contractor shall provide the commissioning agent with normal cut sheets and shop drawing submittals of all commissioned equipment.
 3. Provide additional requested documentation, prior to normal O&M manual submittals, to the commissioning agent for development of startup and functional testing procedures.
 - a. Typically this will include detailed manufacturer installation and startup, operating, troubleshooting and maintenance procedures, full factory testing reports (if any), and full warranty information with the responsibilities of the University to keep the warranty in force clearly identified. In addition, the installation, startup and checkout materials that are shipped with the equipment, including field checkout sheet forms to be used by the factory or field technicians shall be submitted to the commissioning agent.
 - b. The commissioning agent may request further documentation necessary for the commissioning process.
 4. Contractor shall assist in clarifying the operation and control of commissioned equipment in areas where the Specifications, drawings or equipment documentation is not sufficient for writing detailed testing procedures.
 5. Develop a full startup and initial checkout plan using manufacturer's startup procedures and the prefunctional checklists from the commissioning agent for all commissioned equipment. Submit to commissioning agent for review and approval prior to startup.
 6. Provide assistance to the commissioning agent in preparing the specific functional performance test procedures.
 7. During the startup and initial checkout process, execute the electrical related portions of the prefunctional checklist for all commissioned equipment.
 8. Perform and clearly document all completed startup system operational checkout procedures, providing a copy to the commissioning agent.
 9. Address current architectural/engineering punch list items before functional testing.
 10. Ensure that the appropriate technicians are available and present to execute the startup and functional performance testing of commissioned equipment for the duration required to complete the necessary tests, adjustments and problem solving.
 11. Perform functional performance testing under the direction of the commissioning agent for specified equipment. Assist the commissioning agent in interpreting the monitored data, as necessary.

12. Correct deficiencies as interpreted by the commissioning agent and retest the equipment.
 13. Prepare O&M manuals according to the contract documents, include clarifying and updating to correspond with as-built conditions.
 14. Provide training of the University's operating personnel as specified.
- G. The commissioning process does not take away from or reduce the responsibility of the installing contractor to provide a finished and fully functioning installation.

1.2 QUALITY ASSURANCE

- A. The system shall be tested in strict accordance with the latest edition of the following applicable specifications and standards and any other applicable standards, except as otherwise shown or specified:
1. National Fire Protection Association (NFPA).
 2. California Electrical Code (CEC).
 3. InterNational Electrical Testing Association, Inc. (NETA).
 4. American National Standards Institute, Inc. (ANSI).
 5. National Electrical Manufacturer Association (NEMA).
 6. Institute of Electrical and Electronic Engineers (IEEE).
 7. Insulated Cable Engineers Association (ICEA).
 8. Occupational Safety and Health Administration (OSHA).
 9. Factory Mutual (FM) Standards.

1.3 DEFINITIONS

- A. Startup
- B. Prefunctional checklist
- C. Prefunctional testing
- D. Functional performance testing

1.4 SYSTEM DESCRIPTION

- A. Commissioning is a systemic process of ensuring that all building systems perform interactively according to the design intent and the University's operational needs. The commissioning process shall encompass and coordinate the traditionally

separate functions of system documentation, equipment startup, control system calibration, prefunctional checklist, functional performance testing and training.

B. Commissioning on this project is intended to achieve the following specific objectives according to the contract documents:

1. Verify that applicable equipment and systems are installed according to the manufacturer's recommendations and to industry accepted minimum standards and that receive adequate operational checkout by installing contractors.
2. Verify and document proper performance of equipment and systems.
3. Verify that O&M documentation left on site is complete.
4. Verify that the University's operating personnel are adequately trained.

C. Commissioning process:

1. The University shall provide the services of a commissioning agent to develop the commissioning plan and to direct, review and approve the commissioning work.
2. The following is an overview of the anticipated commissioning tasks during construction:
 - a. Commissioning during construction shall begin with a scope meeting conducted by the commissioning agent where the commissioning process is reviewed with all commissioning team members.
 - b. Additional meetings shall be required throughout construction, scheduled by the commissioning agent with necessary parties attending, to plan, scope, coordinate, schedule activities and resolve problems.
 - c. Equipment documentation shall be submitted to the commissioning agent during normal submittal process, including detailed startup procedures.
 - d. The commissioning agent shall work with the contractors in developing startup plans and startup documentation formats, including providing contractors with prefunctional checklists to be completed during the startup process.
 - e. The checkout and performance verification shall proceed from simple to complex; from component level to equipment to systems and inter-system levels with prefunctional checklists being completed before functional testing.
 - f. The contractors, under their own direction, shall execute and document the prefunctional checklists and perform startup and initial checkout. The commissioning agent shall document that the checklists and startup were completed according to the approved plans. This may include the commissioning agent witnessing startup of selected equipment.

- g. The commissioning agent develops specific equipment and system functional performance test procedures for review by the contractors.
- h. The procedures are executed by the contractors, under the direction of, and documented by the commissioning agent.
- i. Items of non-compliance in material, installation or the setup are corrected at the contractor's expense and the system retested.
- j. The commissioning agent reviews the O&M documentation submitted by the contractor for completeness.
- k. The commissioning agent reviews, pre-approves and coordinates the training process provided by the contractor and verifies that it was completed.

1.5 SUBMITTALS

- A. Submit in accordance with the requirements of Section 16010: Basic Electrical Requirements, the following items:
 - 1. Provide a complete list of equipment to be commissioned per the requirements of the Division 16 specifications.
 - 2. Manufacturer's written instruction manuals applicable to commissioned equipment to include special inspection, detailed startup procedures and testing requirements.
 - 3. Plan for startup and initial checkout of commissioned equipment.
 - 4. Upon completion of startup and prefunctional testing for commissioned equipment or systems, provide a test report in the format developed by the commissioning agent.
 - 5. Submit schedule for training of all commissioned equipment for coordination and approval by University's operating personnel.
- B. Provide qualifications for independent testing agency.

1.6 QUALITY ASSURANCE

- A. Provide testing equipment and accessories that are free of defects and are certified for intended use.
- B. Provide testing equipment with current calibration labels.
- C. Independent testing agency shall be a financially stable organization and able to function as an unbiased testing authority, professionally independent of manufacturers, suppliers and installers of equipment or systems evaluated by the testing agency. They shall also be a member of the International Electrical Testing Association (NETA), specializing in the testing of equipment or apparatus specified in this Division with a minimum of 5 years experience.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

- A. The contractor shall provide all standard testing equipment required to perform startup, initial checkout, required functional performance testing and commissioning. Also, the contractor shall provide two-way radios to facilitate communications during commissioning.
- B. Special equipment, tools, and instruments (only available from vendors, specific to a piece of equipment) required for testing equipment, according to these contract documents shall be included.
- C. All testing equipment shall be of sufficient quality and accuracy to test and or measure system performance within the specified tolerances. All equipment should be calibrated according to the manufacturer's recommended intervals.

PART 3 - EXECUTION

3.1 MEETINGS

- A. Within 90 days of commencement of construction, the commissioning agent will schedule, plan and conduct a commissioning scope meeting with the entire commissioning team in attendance. The commissioning agent will distribute meeting minutes to all parties. Information gathering from this meeting will allow the commissioning agent to prepare and finalize the commissioning plan, which will also be distributed to all parties.
- B. Other meetings will be planned and conducted by the commissioning agent as construction progresses. These meetings will cover coordination, deficiency resolution and planning issues with particular contractors. The commissioning agent will plan these meetings and will minimize unnecessary time being spent by contractors. These meetings may be held monthly, until the final three months of construction when they may increase in frequency to one per week.

3.2 EXAMINATION

- A. Inspection commissioned equipment and confirm that it is clean and ready for operation. All shipping tags removed, nameplate installed and equipment manuals in place.
- B. Verify that startup plan and prefunctional checklist are completed and approved for commissioned equipment prior to beginning procedures.
- C. Verify that operational manual/procedures are complete prior to starting the functional performance testing.

- D. Verify that startup and prefunctional testing is complete prior to starting the functional performance testing.

3.3 PREPARATION

- A. Provide required personnel with tools and equipment necessary to perform functional performance testing.
- B. Provide equipment factory representative for startup and commissioning work as necessary or as required by the Specifications.
- C. Provide certified independent testing agency personnel for startup and commissioning work as required by the Specifications.
- D. Provide any necessary temporary power provisions, load banks, diesel fuel, equipment and sundries to complete startup and commissioning work.

3.4 REPORTING

- A. The commissioning agent will regularly communicate with all members of the commissioning team, keeping them apprised of commissioning progress and scheduling changes through memos, progress reports, etc.
- B. Testing or review approvals and non-conformance and deficiency reports are made regularly with the required action by the contractor.

3.5 STARTUP, PREFUNCTIONAL CHECKLISTS AND INITIAL CHECKOUT

- A. The following procedures apply to all systems and all equipment to be commissioned.
- B. Commissioning agent will prepare prefunctional checklist to ensure that the equipment and systems are hooked up and operational. The prefunctional testing for a given system must be successfully completed prior to formal functional performance testing of equipment or subsystems of the given system.
- C. The commissioning agent shall assist the commissioning team members, responsible for startup of any equipment, in the development of detailed startup plans for equipment. The primary role of the commissioning agent in this process is to ensure that there is written documentation that each of the manufacturer-recommended procedures have been completed. Parties responsible for prefunctional checklists and startup are identified in the commissioning scope meeting and in the checklist forms. All required factory startups of equipment must be performed under the guidance and witnessed by the commissioning agent.

3.6 FUNCTIONAL PERFORMANCE TESTING

A. Objective:

1. The objective of the functional performance testing is to demonstrate that each system is operating according to the demonstrated design intent and contract documents. Functional testing facilitates bringing the systems from a state of substantial completion to full dynamic operation. Additionally, during the testing process, areas of deficient performance are identified and corrected, improving the operation and functioning of the systems.
2. Each system shall be operated through all modes of operation where there is a specified system response. Verification of each sequence in the sequence of operation is required. Proper responses to such modes and conditions shall also be tested.

B. The commissioning agent shall witness and document the results of all functional performance tests using the specific procedural forms developed for that purpose. Prior to testing, these forms are provided to the contractor for review and approval.

C. Non-conformance:

1. The commissioning agent will record the results of the functional performance test on the procedure or test forms. All deficiencies or non-conformance issues shall be noted and reported to the contractor on a standard non-compliance form.
2. Corrections of minor deficiencies identified may be made during the tests at the discretion of the commissioning agent. In such cases the deficiency and resolution will be documented on the procedure form.
3. Every effort will be made to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures. However, the commissioning agent will not be pressured into overlooking deficient work or loosening acceptance criteria to satisfy or cost issues, unless there is an overriding reason to do so at the request of the contractor.
4. As tests progress and a deficiency is identified, the commissioning agent shall discuss the issue with the executing contractor.
 - a. When there is no dispute on the deficiency and the contractor accepts responsibility to correct it:
 - 1) The commissioning agent documents the deficiency and the contractor's response with their intentions to correct and continues on with the testing. After the day's work, the commissioning agent submits the non-compliance reports to the contractor. The contractor corrects the deficiency, signs the statement of correction at the bottom of the non-compliance form certifying that the equipment is ready to be retested and submits it back to the commissioning agent.
 - 2) The commissioning agent reschedules the test and the test is repeated.
 - b. If there is a dispute, regarding whether it is a deficiency or determining who is responsible:

- 1) The deficiency shall be documented on the non-compliance form with the contractor's response and a copy given to the contractor.
- 2) Resolutions are made at the lowest management level possible. Other parties are brought into the discussion as needed. Final interpretive authority is with the University's Representative. Final acceptance authority is with the Project Manager.
- 3) The commissioning agent documents the resolution.
- 4) Once the interpretation and resolution have been decided, the appropriate party corrects the deficiency, signs the statement of correction on the non-compliance form and submits it to the commissioning agent.
- 5) The commissioning agent reschedules the test and the test is repeated.

3.7 TRAINING

- A. The contractor shall be responsible for training coordination, scheduling and ultimately to ensure that the training is completed in accordance with the Specifications.
- B. The commissioning agent shall be responsible for overseeing and approving the content and adequacy of the training of District personnel for commissioned equipment.
- C. The electrical contractor shall have the following training responsibilities:
 1. Provide the commissioning agent with a training plan two weeks before the planned training.
 2. Provide designated University personnel with comprehensive orientation and training in the understanding of the systems and the operation and maintenance of each piece of equipment.
 3. Training shall normally start with classroom sessions, followed by hands-on training on each piece of equipment or system, which shall illustrate the various modes of operation.
 4. During any demonstration, should the system fail to perform in accordance with the requirements of the O&M manuals. Specifications or sequence of operation, the system will be repaired or adjusted as necessary and the demonstration repeated.
 5. The appropriate trade or manufacturer's representative shall provide the instructions and hands-on training on each major piece of equipment or system. Practical building operating expertise as well as in-depth knowledge of all modes of operation of the specific equipment or system is required. More than one party may be required to execute the training.

6. The training sessions shall follow the outline in the Table of Contents of the O&M manuals and illustrate whenever possible the use of the O&M manuals for reference.
7. Training shall include:
 - a. Use of printed installation, operation and maintenance instruction material included in the O&M manuals.
 - b. A review of the written O&M instructions emphasizing safe and proper operating procedures, preventative maintenance, special tools needed and spare parts in inventory suggestions. The training shall include startup, operation in all modes possible, shutdown and emergency procedures.
 - c. Discussion of relevant safety issues and concerns.
 - d. Discussion of warranties and guarantees.
 - e. Common troubleshooting problems and solutions.
 - f. Explanatory information included in the O&M manuals and location of all plans and manuals in the facility.
 - g. Discussion of any peculiarities of equipment or system installation or operation.
8. Training shall occur after functional performance testing is complete, unless approved otherwise by the commissioning agent.

END OF SECTION 26 9510