

PROJECT MANUAL 24031.00

**DSA APPLICATION NO: 01-122250
DSA FILE NO: 7-3**

**JACK LONDON ELEMENTARY
BOILER AND CHILLER REPLACEMENT
ANTIOCH, CALIFORNIA**

ANTIOCH UNIFIED SCHOOL DISTRICT

Construction Documents 100%

July 11, 2025

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Antioch Unified School District

Jack London Elementary
Boiler and Chiller Replacement

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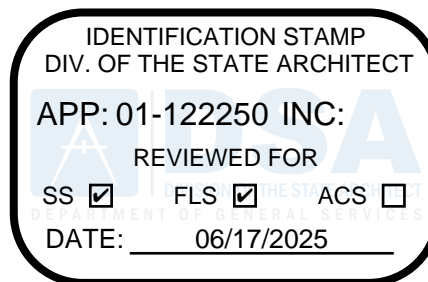
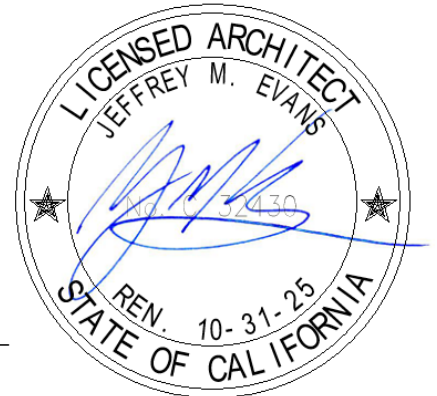
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Antioch Unified School District

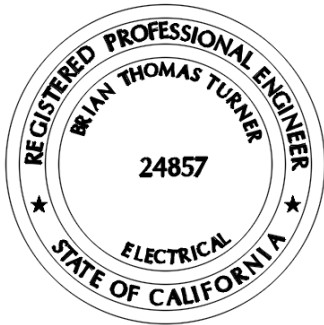
Jack London Elementary
Boiler and Chiller Replacement

DSA Application No: 01-122250

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ANTIOCH, CALIFORNIA

ELECTRICAL ENGINEER



CMTA ENGINEERS

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By: _____

Electrical Engineer

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Antioch Unified School District

Jack London Elementary
Boiler and Chiller Replacement

DSA Application No: 01-122250


DSA File No: 7-3

ANTIOCH, CALIFORNIA

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Antioch Unified School District

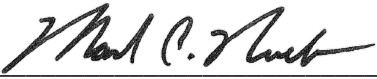
Jack London Elementary
Boiler and Chiller Replacement

DSA Application No: 01-122250
DSA File No: 7-3

ANTIOCH, CALIFORNIA

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BIDDING DOCUMENTS
FOR THE
ANTIOCH UNIFIED SCHOOL DISTRICT
FOR
BOILER AND CHILLER REPLACEMENT
AT
JACK LONDON ELEMENTARY
4550 COUNTRY HILLS DRIVE, ANTIOCH, CA 94531
Project No. 24031.00
DSA Application No. 01-122250
Bid No. 24-25-06

ANTIOCH UNIFIED SCHOOL DISTRICT
510 G Street
Antioch, CA 94509
Telephone: (925) 779-7500

7/8/2025

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NOTICE INVITING BIDS

ANTIOCH UNIFIED SCHOOL DISTRICT

NOTICE IS HEREBY GIVEN that the Antioch Unified School District of Contra Costa County, California, acting by and through its Governing Board, hereinafter referred to as "District", will receive prior to **2:00 PM on Tuesday, August 5th, 2025** sealed bids for the award of a Contract for the following:

BID NO. 24-25-06

PROJECT: JACK LONDON ELEMENTARY BOILER AND CHILLER REPLACEMENT

All bids shall be made and presented only on the forms presented by the District. Bids shall be received in the Facilities Office of the District located at 701 W 18th Street, Antioch, California 94509 and all Bids shall be opened and publicly read aloud at the above stated time and place. The District's time clock shall govern and control the time for all bids to be received by the District and no other clock shall be used to determine the time when bids shall be received by the District in accordance with this Notice Inviting Bids. Any bids received after the time specified above or after any extensions due to material changes shall be returned unopened.

The Contract Time is **261 calendar days** from receipt of Notice of Award and/or from receipt of Notice to Proceed.

CONTRACTOR should consult the General Conditions, Supplementary Conditions, and General Requirements regarding Milestones and Liquidated Damages.

Prequalification of Bidders

As a condition of submitting a bid for this Project, and in accordance with California Public Contract Code section 20111.6, prospective bidders are required to submit to the District a completed set of prequalification documents on forms provided by the District. These documents will be the basis for determining which bidders are qualified to bid on this Project.

Bids will not be accepted if a contractor has not been prequalified where prequalification is required. Prequalification instructions and/or documents are available through Quality Bidders' website at <https://www.qualitybidders.com>. Prequalification documents must be submitted by each contractor no later than ten (10) business days prior to the bid opening date. Contractors will be notified by Quality Bidders of their prequalification rating within a reasonable period of time after submission of their prequalification documents, but not less than five (5) business days prior to the bid opening date.

If this Project includes work that will be performed by mechanical, electrical or plumbing ("MEP") subcontractors (contractors that **hold** C-4, C-7, C-10, C-16, C-20, C-34, C-36, C-38, C-42, C-43 or C-46 licenses), such MEP subcontractors must also be prequalified. A list of prequalified MEP subcontractors will be made available by the District to all bidders at least five business days prior to the bid opening date. It is the responsibility of the bidder to ensure that all MEP subcontractors **holding** any of the licenses listed above are properly prequalified before submitting a bid. This prequalification requirement applies even if the subcontractor will perform, or is designated to perform, work that does not require one of the licenses listed above, but the subcontractor **holds** one of the licenses listed above.

Miscellaneous Information

Bids shall be received in the place identified above, and shall be opened and publicly read aloud at the above-stated time and place.

The Contract Documents, including but not limited to all Bid Documents, are available at Antioch Unified School District. It is the responsibility of each prospective bidder to obtain all Contract Documents for review and to verify the completeness of all Contract Documents before submitting a Bid. It is the responsibility of each prospective bidder to check with the District on a daily basis through the close of bids for any applicable Addenda or updates. The District does not assume any liability or responsibility based on any defective or incomplete copying, excerpting, scanning, faxing, downloading or printing of the Contract Documents or any Bid Documents.

There will be a mandatory Pre-Bid Conference on Thursday, July 24th, 2025 at the Jack London Elementary School Campus (4550 Country Hills Drive; Antioch, CA 94531). Any Contractor bidding on the Project who fails to attend the entire mandatory job walk and conference will be deemed a non-responsive bidder and will have its bid returned unopened.

Each bidder shall be a licensed contractor pursuant to the California Business and Professions Code, and be licensed to perform the work called for in the Contract Documents. The successful bidder must possess a valid and active Class A and/or Class B License at the time of bid and throughout the duration of this Contract. The Contractor's California State License number shall be clearly stated on the bidder's proposal.

Subcontractors shall be licensed pursuant to California law for the trades necessary to perform the Work called for in the Contract Documents.

Each bid must strictly conform with and be responsive to the Contract Documents as defined in the General Conditions.

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

Each bidder shall submit with its bid — on the form furnished with the Contract Documents — a list of the designated subcontractors on this Project as required by the Subletting and Subcontracting Fair Practices Act, California Public Contract Code section 4100 et seq.

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

Each bidder's bid must be accompanied by one of the following forms of bidder's security: (1) cash; (2) a cashier's check made payable to the District; (3) a certified check made payable to the District; or (4) a bidder's bond executed by a California admitted surety as defined in Code of Civil Procedure section 995.120, made payable to the District in the form set forth in the Contract Documents. Such bidder's security must be in an amount not less than ten percent (10%) of the maximum amount of bid as a guarantee that the bidder will enter into the proposed Contract, if the same is awarded to such bidder, and will provide

the required Performance and Payment Bonds, insurance certificates and any other required documents. In the event of failure to enter into said Contract or provide the necessary documents, said security will be forfeited.

The Contractor and all subcontractors shall comply with the requirements set forth in Division 2, Part 7, Chapter 1 of the Labor Code. The District has obtained from the Director of the Department of Industrial Relations the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work in the locality in which this work is to be performed for each craft, classification or type of worker needed to execute the Contract. These per diem rates, including holiday and overtime work, as well as employer payments for health and welfare, pension, vacation, and similar purposes, are on file at the District, and are also available from the Director of the Department of Industrial Relations. Pursuant to California Labor Code section 1720 et seq., it shall be mandatory upon the Contractor to whom the Contract is awarded, and upon any subcontractor under such Contractor, to pay not less than the said specified rates to all workers employed by them in the execution of the Contract.

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

All payroll records as detailed in Labor Code §1776 of the Contractor and all Subcontractors shall be certified and furnished directly to the Labor Commissioner in accordance with Labor Code §1771.4(a)(3) once every thirty (30) days while Work is being performed on the Project and within thirty (30) days after the final day of Work performed on the Project (or more frequently if required by the District or the Labor Commissioner). The Contractor and all Subcontractors shall submit their own payroll records to the Labor Commissioner on the internet website of the Department of Industrial Relations and such payroll records shall be in an electronic format prescribed by the Labor Commissioner. Monitoring and enforcement of the prevailing wage laws and related requirements will be performed by the Labor Commissioner/ Department of Labor Standards Enforcement (DLSE).

Each Bidder shall comply with all In-Use Off-Road Diesel-Fueled Fleets Regulations (the "Fleets Regulation") implemented by the California Air Resources Board ("CARB") which apply broadly to all self-propelled off-road diesel vehicles 25 horsepower or greater and other forms of equipment used in California. Bidders are required to comply with all CARB orders and Fleets Regulation requirements, including, without limitation, all applicable sections of the Fleets Regulation, as codified in Title 13 of the California Code of Regulations section 2449 et seq. throughout the duration of the Project. Bidders must provide, with their Bid, copies of the Bidder's and all listed subcontractors' most recent and valid Certificate(s) of Reported Compliance ("CRC") issued by the CARB. Any Bidder's failure to provide valid CRCs as required herein may render such Bidder's Bid non-responsive. Additionally, any Bidder's failure to complete and submit the enclosed Fleet Compliance Certification form with its Bid, may render such Bid non-responsive.

No bidder may withdraw any bid for a period of ninety (90) calendar days after the date set for the opening of bids.

Separate payment and performance bonds, each in an amount equal to 100% of the total Contract amount, are required, and shall be provided to the District prior to execution of the Contract and shall be in the form set forth in the Contract Documents.

All bonds (Bid, Performance, and Payment) must be issued by a California admitted surety as defined in California Code of Civil Procedure section 995.120.

Where applicable, bidders must meet the requirements set forth in Public Contract Code section 10115 et seq., Military and Veterans Code section 999 et seq. and California Code of Regulations, Title 2, Section 1896.60 et seq. regarding Disabled Veteran Business Enterprise (“DVBE”) Programs. Forms are included in this Bid Package.

Any request for substitutions pursuant to Public Contract Code section 3400 must be made at the time of Bid on the Substitution Request Form set forth in the Contract Documents and included with the bid.

No telephone or facsimile machine will be available to bidders on the District premises at any time.

It is each bidder’s sole responsibility to ensure its bid is timely delivered and received at the location designated as specified above. Any bid received at the designated location after the scheduled closing time for receipt of bids shall be returned to the bidder unopened.

INSTRUCTIONS TO BIDDERS

1. Preparation of Bid Form. Proposals under these specifications shall be submitted on the blank forms furnished herewith at the time and place stated in the Notice Inviting Bids. The District's time clock shall govern and control the time for all bids to be received by the District and no other clock shall be used to determine the time when bids shall be received by the District in accordance with the Notice Inviting Bids. All blanks in the bid form must be appropriately filled in, and all proposed prices must be stated clearly and legibly in both words and numerals. All bids must be signed by the bidder in permanent black or blue ink and submitted to the District in accordance with the Notice Inviting Bids. The District reserves the right to reject any Bid if all of the above information is not furnished. It is each Bidder's sole responsibility to ensure its Bid is timely submitted and received by the District in accordance with the Notice Inviting Bids. Any bid received by the District after the scheduled closing time for the receipt of Bids shall be returned to the Bidder unopened.

2. Bid Security. Each bid must be accompanied by one of the following forms of bidder's security: (1) cash; (2) a cashier's check made payable to the District; (3) a certified check made payable to the District; or (4) a bidder's bond executed by a California admitted surety as defined in Code of Civil Procedure section 995.120, made payable to the District, in the form set forth in the Contract Documents. Such bidder's security must be in an amount not less than ten percent (10%) of the maximum amount of such bidder's bid as a guarantee that the bidder will enter into the Contract, if the same is awarded to such bidder, and will provide the required Performance and Payment Bonds, insurance certificates and any other required documents. In the event that a bidder is awarded the Contract and such bidder fails to enter into said Contract or provide the surety bond or bonds within five (5) calendar days after award of the Contract to bidder, said security will be forfeited.

3. Signature. The bid form, all bonds, all designations of subcontractors, the Contractor's Certificate, the Agreement, and all Guarantees must be signed in permanent blue ink in the name of the bidder and must bear the signature in longhand of the person or persons duly authorized to sign the bid.

If bidder is a corporation, the legal name of the corporation shall first be set forth, together with two signatures: one from the President and one from the Secretary or Assistant Secretary. Alternatively, the signature of other authorized officers or agents may be affixed, if a certified copy of the resolution of the corporate board of directors authorizing them to do so is provided to the District. Such documents shall include the title of such signatories below the signature and shall bear the corporate seal.

If bidder is a partnership, the true name of the firm shall first be set forth, together with the names of all persons comprising the partnership or co-partnership. The bid must be signed by all partners comprising the partnership unless proof in the form of a certified copy of a statement of partnership acknowledging the signer to be a general partner is presented to the District, in which case the general partner may sign.

Bids submitted as joint ventures must so state and be signed by each joint venturer.

Bids submitted by individuals must be signed by the bidder unless an up to date power- of-attorney is on file in the District office, in which case, said person may sign for the individual.

The above rules also apply in the case of the use of a fictitious firm name. In addition, however, where a fictitious name is used, it must be so indicated in the signature.

4. Modifications. Changes in or additions to the bid form, recapitulations of the work bid upon, alternative proposals, or any other modification of the bid form which is not specifically called for in the Contract Documents may result in the District's rejection of the bid as not being responsive to the Notice Inviting Bids. **No oral or telephonic modification of any bid submitted will be considered.**

5. Erasures, Inconsistent or Illegible Bids. The bid submitted must not contain any erasures, interlineations, or other corrections unless each such correction creates no inconsistency and is suitably authenticated by affixing in the margin immediately opposite the correction the signature or signatures of the person or persons signing the bid. In the event of inconsistency between words and figures in the bid price, words shall control figures. In the event that the District determines that any bid is unintelligible, inconsistent, or ambiguous, the District may reject such bid as not being responsive to the Notice Inviting Bids.

6. Examination of Site and Contract Documents. Each bidder shall visit the site of the proposed work and become fully acquainted with the conditions relating to the construction and labor so that the facilities, difficulties, and restrictions attending the execution of the work under the Contract are fully understood. Bidders shall thoroughly examine and be familiar with the drawings and specifications and all other documents and requirements that are attached to and/or contained in the Project Manual or other documents issued to bidders. The failure or omission of any bidder to receive or examine any Contract Documents, form, instrument, addendum, or other document or to visit the site and become acquainted with conditions there existing shall not relieve any bidder from obligations with respect to the bid or to the contract. The submission of a bid shall be taken as prima facie evidence of compliance with this Section. Bidders shall not, at any time after submission of the bid, dispute, complain, or assert that there were any misunderstandings with regard to the nature or amount of work to be done.

7. Withdrawal of Bids. Any bid may be withdrawn, either personally or by written request, at any time prior to the scheduled closing time for receipt of bids. The bid security for bids withdrawn prior to the scheduled closing time for receipt of bids, in accordance with this paragraph, shall be returned upon demand therefor.

No bidder may withdraw any bid for a period of ninety (90) calendar days after the date set for the opening of bids.

8. Agreements, Insurance and Bonds. The Agreement form which the successful bidder, as Contractor, will be required to execute, and the forms and amounts of surety bonds and insurance endorsements which Contractor will be required to be furnished at the time of execution of the Agreement, are included in the Bid Documents and should be carefully examined by the bidder. The number of executed copies of the Agreement, the Performance Bond, and the Payment Bond required is three (3). Payment and Performance bonds must be executed by an admitted surety insurer as defined in Code of Civil Procedure 995.120. Additionally, the Contractor must provide to the District with its executed Agreement: (i) a complete and accurate copy of the Contractor's Workplace Violence Prevention Plan in accordance with Labor Code Section 6401.9 that is applicable to the Project (the "Project WVPP"); and (ii) the name, position, and telephone number of each person having responsibility for implementing the Project WVPP and receiving reports of workplace violence, if and to the extent that information is not conspicuously specified in the Project WVPP.

9. Interpretation of Plans and Documents/Pre-Bid Clarification. If any prospective bidder is in doubt as to the true meaning of any part of the Contract Documents, or finds discrepancies in, or omissions, a written request for an interpretation or correction thereof may be submitted to the District. The bidder submitting the request shall be responsible for its prompt delivery. **Any interpretation or correction of**

the Contract Documents will only be made by Addendum duly issued, and a copy of such Addendum will be made available for each contractor receiving a set of the Contract Documents. No person is authorized to make any oral interpretation of any provision in the Contract Documents, nor shall any oral interpretation be binding on the District. If discrepancies on drawings, specifications or elsewhere in the Contract Documents are not covered by addenda, bidder shall include in their bid methods of construction and materials for the higher quality and complete assembly. Each request for clarification shall be submitted to the District in writing, via email, to only the following person(s)

TO: Miguel Cruz, Antioch Unified School District, MiguelCruz@antiochschools.net
CC: Austin Gray, Lathrop Construction Associates, Austin.Gray@lathropconstruction.com

Each transmitted request shall contain the name of the person and/or firm filing the request, address, telephone and fax number, Specifications and/or Drawing number. Bidder is responsible for the legibility of any and all requests. Pre-bid clarification requests shall be filed a minimum of **six (6)** days prior to the bid opening. Requests received less than **six (6)** days before the bid opening shall not be considered or responded to by the District. The District will issue a written response to all timely pre-bid clarification requests that materially affect a bidder's price through an Addendum duly issued by the District not less than seventy-two (72) hours prior to the bid opening.

10. Bidders Interested in More Than One Bid. No person, firm, or corporation shall be allowed to make, or file, or be interested in more than one prime bid for the same work unless alternate bids are specifically called for. A person, firm, or corporation that has submitted a proposal to a bidder, or that has quoted prices of materials to a bidder, is not thereby disqualified from submitting a proposal or quoting prices to other bidders or making a prime proposal.

11. Award of Contract. The Contract will be awarded to the lowest responsive responsible bidder by action of the governing Board. The District reserves the right to reject any or all bids, or to waive any irregularities or informalities in any bids or in the bidding process. In the event an award is made to bidder, and such bidder fails or refuses to execute the Contract and provide the required documents detailed in Section 8 above within five (5) calendar days after award of the Contract to bidder, the District may award the Contract to the next lowest responsible and responsive bidder or release all bidders. **Each bid must conform and be responsive to the Contract Documents as defined in the General Conditions.**

12. Bid Protest Procedure. Any bidder may file a bid protest. The protest shall be filed in writing with the District's Director of Facilities not more than five (5) business days after the date of the bid opening. An e-mail address shall be provided and by filing the protest, protesting bidder consents to receipt of e-mail notices for purposes of the protest and protest related questions and protest appeal, if applicable. The protest shall specify the reasons and facts upon which the protest is based.

a. Resolution of Bid Controversy: Once the bid protest is received, the apparent lowest responsible bidder will be notified of the protest and the evidence presented. If appropriate, the apparent low bidder will be given an opportunity to rebut the evidence and present evidence that the apparent low bidder should be allowed to perform the Work. If deemed appropriate by the District, an informal hearing will be held. District will issue a written decision within fifteen (15) calendar days of receipt of the protest, unless factors beyond the District's reasonable control prevent such resolution. The decision on the bid protest will be copied to all parties involved in the protest.

b. Appeal: If the protesting bidder or the apparent low bidder is not satisfied with the decision, the matter may be appealed to the Associate Superintendent, Business & Operations or their designee, within three (3) business days after receipt of the District's written decision on the bid protest.

The appeal must be in writing and sent via overnight registered mail with all accompanying information relied upon for the appeal and an e-mail address from which questions and responses may be provided to:

Antioch Unified School District
Business Department
510 G Street
Antioch, CA 94509

c. Appeal Review: The Associate Superintendent, Business & Operations or their designee shall review the decision on the bid protest from the Director of Facilities and issue a written response to the appeal, or if appropriate, appoint a Hearing Office to conduct a hearing and issue a written decision. The written decision of the Assistant Superintendent or the Hearing Officer shall be rendered within fifteen (15) calendar days and shall state the basis for the decision. The decision concerning the appeal will be final and not subject to any further appeals.

d. Reservation of Rights to Proceed with Project Pending Appeal. The District reserves the right to proceed to award the Project and commence construction pending an Appeal. If there is State Funding or a critical completion deadline, the District may choose to shorten the time limits set forth in this Section if written notice is provided to the protesting party. E-mailed notice with a written confirmation sent by First Class Mail shall be sufficient to constitute written notice. If there is no written response to a written notice shortening time, the District may proceed with the award.

e. Finality. Failure to comply with this Bid Protest Procedure shall constitute a waiver of the right to protest and shall constitute a failure to exhaust the protesting bidder's administrative remedies.

13. Alternates. If alternate bids are called for, the Contract may be awarded at the election of the Governing Board to the lowest responsible and responsive bidder using the method and procedures outlined in the Notice Inviting Bids and as specified in the section entitled Alternate/Deductive Bid Alternates.

a. Subcontractor Listing for Alternates. If alternate bids are called for and the bidder intends to use different or additional subcontractors, a separate list of subcontractors must be submitted for each such alternate.

14. Evidence of Responsibility. Upon the request of the District, a bidder whose bid is under consideration for the award of the Contract shall submit promptly to the District satisfactory evidence showing the bidder's financial resources, surety and insurance claims experience, construction experience, completion ability, workload, organization available for the performance of the Contract, and other factors pertinent to a Project of the scope and complexity involved.

15. Listing Subcontractors. Each bidder shall submit with his bid, on the form furnished with the Contract Documents, a list of the names, license numbers, scopes of work, locations of the places of business, contact information, and Department of Industrial Relations ("DIR") registration numbers of each subcontractor who will perform work or labor or render service to the bidder in or about the project, or a subcontractor who under subcontract to the bidder, specially fabricates and installs a portion of the work, in an amount in excess of one-half of 1 percent of the bidder's total bid as required by the Subletting and Subcontracting Fair Practices Act (Public Contract Code section 4100, et seq.) Pursuant to Labor Code section 1725.5, all subcontractors (of any tier) performing work on this Project must be properly registered with DIR.

16. Workers' Compensation. In accordance with the provisions of Labor Code section 3700, the successful bidder as the Contractor shall secure payment of compensation to all employees. The Contractor shall sign and file with the District the following certificate prior to performing the work under this contract: "I am aware of the provisions of Section 3700 of the Labor Code, which requires every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this contract." The form of such certificate is included as a part of the Bid Documents.

17. Contractor's License. To perform the work required by this notice, the Contractor must possess the Contractor's License as specified in the Notice Inviting Bids, and the Contractor must maintain the license throughout the duration of the contract. If, at the time of bid, bidder is not licensed to perform the Project in accordance with Division 3, Chapter 9, of the Business and Professions Code for the State of California and the Notice to Contractors calling for bids, such bid will not be considered and the Contractor will forfeit its bid security to the District.

18. 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 employee engaged in the work because of race, color, ancestry, national origin, religious creed, sex, age, or marital status. The Contractor agrees to comply with applicable federal and California laws, including, but not limited to, the California Fair Employment and Housing Act, beginning with Government Code section 12900 and Labor Code section 1735. In addition, the Contractor agrees to require like compliance by any subcontractors employed on the work by such Contractor.

19. Preference for Materials and Substitutions.

a. One Product Specified. Unless the Plans and Specifications state that no Substitution is permitted, whenever the Contract Documents indicate any specific article, device, equipment, product, material, fixture, patented process, form, method, construction, or any specific name, make, trade name, or catalog number, with or without the words, "or equal," such specification shall be read as if the language "or equal" is incorporated.

b. Request for Substitution. Bidder may, unless otherwise stated, offer any material, process, article, etc., which is materially equal or better in every respect to that so indicated or specified ("Specified Item") and will completely accomplish the purpose of the Contract Document. If bidder desires to offer a Substitution for a Specified Item, such bidder must make a request in writing on the District's Substitution Request Form ("Request Form") and submit the completed Request Form with the bidder's bid. The Request Form must be accompanied by evidence as to whether the proposed substitution:

- 1) Is equal in quality, service, and ability to the Specified Item as demonstrated by a side by side comparison of key characteristics and performance criteria (CSI comparison chart);
- 2) Will entail no changes in detail, construction and scheduling of related work;
- 3) Will be acceptable in consideration of the required design and artistic effect;
- 4) Will provide no cost disadvantage to the District;
- 5) Will require no excessive or more expensive maintenance, including adequacy and availability of replacement parts; and
- 6) Will require no change in the Contract Time.

In completing the Request Form, bidder must state with respect to each requested substitution whether bidder will agree to provide the Specified Item in the event that the District denies bidder's request for substitution of a Specified Item. In the event that bidder does not agree in the Request

Form to provide the Specified Item and the District denies the requested Substitution, the bidder's bid shall be considered non-responsive and the District may award the Contract to the next lowest bidder or in its sole discretion, release all bidders. In the event that bidder has agreed in the Request Form to provide the Specified Item and the District denies bidder's requested substitution for a Specified Item, bidder shall execute the Agreement and provide the Specified Item without any additional cost or charge to the District, and if bidder fails to execute the Agreement with the Specified Item(s), bidder's bid bond will be forfeited.

After the bids are opened, the apparent lowest bidder shall provide, within five (5) calendar days of opening such bids, any and all Drawings, Specifications, samples, performance data, calculations, and other information as may be required to assist the Architect and the District in determining whether the proposed substitution is acceptable. The burden of establishing these facts shall be upon the bidder.

After the District's receipt of such evidence by bidder, the District will make its final decision as to whether the bidder's request for Substitution for any Specified Items will be granted. The District shall have sole discretion in deciding as to whether a proposed request for Substitution is equal to or better than a Specified Item. Any request for Substitution which is granted by the District shall be documented and processed through a Change Order. The District may condition its approval of any Substitution upon delivery to the District of an extended warranty or other assurances of adequate performance of the Substitution. Any and all risks of delay due to DSA, or any other governmental agency having jurisdiction shall be on the bidder.

20. Disqualification of Bidders and Proposals. More than one proposal for the same work from any individual, firm, partnership, corporation, or association under the same or different names will not be accepted; and reasonable grounds for believing that any bidder is interested in more than one proposal for the work will be cause for rejecting all proposals in which such bidder is interested and the bidder will forfeit their bid security to the District.

21. Unbalanced or Altered Bids. Proposals in which the prices are obviously unbalanced, and those which are incomplete or show any alteration of form, or contain any additions or conditional or alternate bids that are not called for or otherwise permitted, may be rejected. A proposal on which the signature of the bidder has been omitted may be rejected. If, in the District's sole discretion, it determines any pricing, costs or other information submitted by a bidder may result in an unbalanced bid, the District may deem such bid non-responsive. A bid may be determined by the District to be unbalanced if the bid is based on prices significantly less than cost for some work and prices which are significantly overstated in relation to cost for other work, and if there is a reasonable doubt that the bid will result in the lowest overall cost to the District even though it may be the low evaluated bid, or if it is so unbalanced as to be tantamount to allowing an advanced payment.

22. Employment of Apprentices. The Contractor and all Subcontractors shall comply with the provisions of California Labor Code including, but not limited to sections 1777.5, 1777.6, and 1777.7 concerning the employment of apprentices. The Contractor and any Subcontractor under him shall comply with the requirements of said sections, including applicable portions of all subsequent amendments in the employment of apprentices; however, the Contractor shall have full responsibility for compliance with said Labor Code sections, for all apprenticeable occupations, regardless of any other contractual or employment relationships alleged to exist.

23. Non-Collusion Declaration. Public Contract Code section 7106 requires bidders to submit declaration of non-collusion with their bids. This form is included with the bid documents and must be signed and dated by the bidder under penalty of perjury.

24. Wage Rates, Travel and Subsistence.

a. The Contractor and all subcontractors shall comply with the requirements set forth in Division 2, Part 7, Chapter 1 of the Labor Code. Pursuant to Labor Code section 1770 et seq., the District has obtained from the Director of the Department of Industrial Relations the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work in the locality in which this work is to be performed for each craft, classification or type of worker needed to execute the contract. Copies are available from the District to any interested party on request and are also available from the Director of the Department of Industrial Relations. The Contractor shall obtain copies of the above-referenced prevailing wage sheets and post a copy of such wage rates at appropriate, conspicuous, weatherproof points at the Site.

b. Any worker employed to perform work on the Project and such work is not covered by any classification listed in the published general prevailing wage rate determinations or per diem wages determined by the Director of the Department of Industrial Relations, shall be paid not less than the minimum rate of wages specified therein for the classification which most nearly corresponds to the employment of such person in such classification.

c. Holiday and overtime work, when permitted by law, shall be paid for at the rate set forth in the prevailing wage rate determinations issued by the Director of the Department of Industrial Relations or at least one and one-half (1½) times the specified basic rate of per diem wages, plus employer payments, unless otherwise specified in the Contract Documents or authorized by law.

d. These per diem rates, including holiday and overtime work, and employer payments for health and welfare, pension, vacation, and similar purposes, are on file at the administrative office of the District, located as noted above and are also available from the Director of the Department of Industrial Relations. It is the Contractor's responsibility to ensure the appropriate prevailing rates of per diem wages are paid for each classification. It shall be mandatory upon the Contractor to whom the Contract is awarded, and upon any subcontractor under such Contractor, to pay not less than the said specified rates to all workers employed by them in the execution of the Contract.

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

This Project is a public works project as defined in Labor Code section 1720. Each contractor bidding on this Project and all subcontractors (of any tier) performing any portion of the Work must comply with the Labor Code sections 1725.5 and 1771.1 and must be properly and currently registered with DIR and qualified to perform public works pursuant to Labor Code section 1725.5 throughout the duration of the Project. For more information and up to date requirements, contractors are recommended to periodically review the DIR's website at www.dir.ca.gov. Contractor shall be solely responsible for ensuring compliance with Labor Code section 1725.5 as well as any requirements implemented by DIR applicable to its services or its subcontractors throughout the term of the Agreement and in no event shall contractor be granted increased payment from the District or any time extensions to complete the Project as a result of contractor's efforts to maintain compliance with the Labor Code or any requirements implemented by the DIR. Failure to comply with these requirements shall be deemed a material breach of this Agreement

and grounds for termination for cause. The contractor and all subcontractors shall furnish certified payroll records as required pursuant Labor Code section 1776 directly to the Labor Commissioner in accordance with Labor Code section 1771.4(a)(3) once every thirty (30) days while Work is being performed on the Project and within thirty (30) days after the final day of Work performed on the Project (or more frequently if required by the District or the Labor Commissioner). The Contractor and all Subcontractors shall submit their own payroll records to the Labor Commissioner on the internet website of the Department of Industrial Relations and such payroll records shall be in an electronic format and manner prescribed by the Labor Commissioner. The District reserves the right to withhold contract payments if the District is notified, or determines as the result of its own investigation, that contractor is in violation of any of the requirements set forth in Labor Code section 1720 et seq. at no penalty or cost to the District. Monitoring and enforcement of the prevailing wage laws and related requirements will be performed by the Labor Commissioner/ Department of Labor Standards Enforcement (DLSE).

26. No Telephone or Facsimile Availability. No telephone or facsimile machine will be available to bidders on the District premises at any time.

27. Obtaining Bidding Documents. Bidding Documents, may be obtained from the Construction Manager at:

Lathrop Construction Associates, Inc.
Email: bids@lathropconstruction.com
Phone # 707-746-8000

Bidder shall utilize a complete set of Bidding Documents in preparing a bid. The failure or omission of bidder to receive any Bidding Document, form, instrument, Addendum, or other document shall not relieve bidder from any obligations with respect to the bid and/or Contract.

28. Addenda. The District reserves the right to revise the Contract Documents prior to the Bid Opening date. Clarifications, revisions or any other notice of a change in the Contract Documents will be issued only by the District and only in the form of a written Addendum. Each prospective Bidder shall provide the District a name, address, email 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 fax, mail, e-mail, or other proper means of delivery to all who are known by the issuing office to have received a complete set of the Contract Documents and provided such current information. Any other purported Addenda are void and unenforceable.

Bidder is responsible for receiving and ascertaining the disposition of all Addenda issued regardless of District notification and to acknowledge all Addenda in the submitted sealed bid prior to the Bid Opening. Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for inspection. Each Addendum will be numbered, dated, and identified with the Project number. Oral statements or any instructions in any form, other than Addendum as described above, shall be void and unenforceable. Any Addendum duly issued by the District and not noted as being acknowledged by Bidder as required in the Bid Form, may result in the Bid being deemed non-responsive.

29. Debarment. Bidder may also be subject to debarment, in addition to seeking remedies for False Claims under Government Code section 12650 et seq. and Penal Code section 72, the District may debar a Contractor pursuant to Article 15 of the General Conditions if the Board, or the Board may designate a hearing officer who, in his or her discretion, finds the Contractor has done any of the following:

- a. Intentionally or with reckless disregard, violated any term of a contract with the District

b. Committed an act or omission which reflects on the Contractor's quality, fitness or capacity to perform work for the District;

c. Committed an act or offense which indicates a lack of business integrity or business honesty; or,

d. Made or submitted a false claim against the District or any other public entity (See Government Code section 12650, et seq., and Penal Code section 72).

30. Iran Contracting Act Certification Form. Each bidder shall submit a completed Iran Contracting Act Certification Form to the District with its Bid. Failure to (1) submit a fully executed Iran Contracting Act Certification Form to the District prior to the Bid Opening, or (2) complete any required portion of the Iran Contracting Act Certification Form may result in the bidder/Contractor being deemed non-responsive by the District.

31. Fleet Compliance Certification Form. The District is a Public Works Awarding Body, as defined under Title 13 California Code of Regulations section 2449(c)(46). Accordingly, all Bidders must submit, with their Bids, valid Certificate(s) of Reported Compliance ("CRC") for the Bidder's fleet and for the fleet(s) of its listed subcontractors (including any applicable leased equipment or vehicles). Each Bidder must also complete and submit to the District, with its Bid, the enclosed Fleet Compliance Certification form for the Project. **FAILURE TO PROVIDE ALL APPLICABLE CRC'S TO THE DISTRICT FOR THE BIDDER, AND FOR ALL LISTED SUBCONTRACTORS, MAY RENDER A BID NON-RESPONSIVE. ADDITIONALLY, FAILURE TO COMPLETE AND SUBMIT THE ENCLOSED FLEET COMPLIANCE CERTIFICATION FORM, MAY RENDER A BID NON-RESPONSIVE.**

CHECKLIST OF MANDATORY BID FORMS

(For Contractor's use and reference only. Additional documents may be required so bidders should carefully review all Contract Documents and Bid Documents)

- ☐ Designation of Subcontractors
- ☐ Bid Form
- ☐ Contractor's Certificate Regarding Workers Compensation (form must be provided with bid documents even though an OCIP is in-place)
- ☐ Non-Collusion Declaration
- ☐ Bid Bond (or Bid Guarantee form if Security is other than Bid Bond)
- ☐ Substitution Request Form (If Substitution Request Form is not submitted then NO Substitutions will be allowed after the bids are opened)
- ☐ Acknowledgment of Bidding Practices Regarding Indemnity
- ☐ DVBE Participation Statement
- ☐ Contractor's Certificate Regarding Drug-Free Workplace
- ☐ Contractor's Certificate Regarding Alcoholic Beverage and Tobacco-Free Campus Policy
- ☐ Iran Contracting Act Certification Form
- ☐ Fleet Compliance Certification Form and All Applicable Certificates of Reported Compliance

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|-----------------|---|--------|--|
| PROJECT NAME: | Jack London Elementary Boiler & Chiller Replacement | | |
| PROJECT NUMBER: | 24031.00 | | |
| | Miguel Cruz & | | MiguelCruz@antiochschools.net |
| TO: | Austin Gray | EMAIL: | Austin.Gray@lathropconstruction.com |

| | | | | |
|---------------------------|--|-----------------|--------|--|
| DATE: | | | | |
| FROM: | | | EMAIL: | |
| DOCUMENT/DIVISION NUMBER: | | DRAWING NUMBER: | | |

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| REQUESTED CLARIFICATION: | |
| RESPONSE TO CLARIFICATION: | |

Attach additional numbered sheets as necessary; however, only one (1) request shall be contained on each submitted form.

DESIGNATION OF SUBCONTRACTORS

In compliance with the Subletting and Subcontracting Fair Practices Act (California Public Contract Code section 4100 et seq.) and any amendments thereof, each Bidder shall set forth below: (a) the name, license number, and location of the place of business of each subcontractor who will perform work or labor or render service to the Contractor, who will perform work or labor or work or improvement to be performed under this Contract, or a subcontractor licensed by the State of California who, under subcontract to the Contractor, specially fabricates and installs a portion of the work or improvements according to detailed Drawings contained in the Plans and Specifications in an amount in excess of one-half of one percent of the Contractor's total bid; and (b) the portion and description of the work which will be done by each subcontractor under this Act. The Contractor shall list only one subcontractor for each such portion as is defined by the Contractor in this bid. All subcontractors shall be properly licensed by the California State Licensing Board.

If a Contractor fails to specify a subcontractor, or if a Contractor specifies more than one subcontractor for the same portion of work to be performed under the Contract in excess of one-half of one percent of the Contractor's total bid, the Contractor shall be deemed to have agreed that the Contractor is fully qualified to perform that portion, and that the Contractor alone shall perform that portion.

No Contractor whose bid is accepted shall (a) substitute any subcontractor, (b) permit any subcontractor to be voluntarily assigned or transferred or allow the relevant portion of the work to be performed by anyone other than the original subcontractor listed in the original bid, or (c) sublet or subcontract any portion of the work in excess of one-half of one percent of the Contractor's total bid where the original bid did not designate a subcontractor, except as authorized in the Subletting and Subcontracting Fair Practices Act.

Subletting or subcontracting of any portion of the work in excess of one-half of one percent of the Contractor's total bid where no subcontractor was designated in the original bid shall only be permitted in cases of public emergency or necessity, and then only after a finding, reduced to writing as a public record, of the authority awarding this Contract setting forth the facts constituting the emergency or necessity.

All subcontractors (of any tier) performing any portion of the Work must comply with the Labor Code sections 1725.5 and 1771.1 and must be properly and currently registered with the California Department of Industrial Relations and qualified to perform public works pursuant to Labor Code section 1725.5 throughout the duration of the Project.

NOTE: If alternate bids are called for and bidder intends to use different or additional subcontractors on the alternates, a separate list of subcontractors must be provided for each such Alternate.

DESIGNATION OF SUBCONTRACTORS FORM

| Scope of Work | Name of Subcontractor | Location & Place of Business | License Type and Number | DIR Registration Number | <i>E-Mail & Telephone*</i> |
|----------------------|------------------------------|---|--------------------------------|--------------------------------|---------------------------------------|
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| Scope of Work | Name of Subcontractor | Location & Place of Business | License Type and Number | DIR Registration Number | <i>E-Mail & Telephone*</i> |
|----------------------|------------------------------|---|--------------------------------|--------------------------------|---------------------------------------|
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* This information must be provided at the time of submission of bid or must be provided within 24 hours after the time set for the opening of bids. Bidders who choose to provide this information within 24 hours after the time set for the opening of bids are solely responsible to ensure the District receives this information in a timely manner. The District is not responsible for any problems or delays associated with emails, faxes, delivery, etc. Absent a verified fax or email receipt date and time by the District, the District's determination of whether the information was received timely shall govern and be determinative. Bidder shall not revise or amend any other information in this form submitted at the time of bid. The information submitted at the time of bid shall govern over any conflicts, discrepancies, ambiguities or other differences in any subsequent Subcontractor Designation Forms submitted by the bidder.

Proper Name of Bidder:

Date:

Name:

Signature of Bidder

Representative:

Address:

Phone:

BID FORM

FOR

Boiler and Chiller Replacement

Jack London Elementary

4550 Country Hills Drive, Antioch, CA 94531

Project No. 24031.00

Bid No. 24-25-06

FOR

ANTIOCH UNIFIED SCHOOL DISTRICT

CONTRACTOR
NAME:

ADDRESS:

TELEPHONE:

() _____

FAX:

() _____

EMAIL

TO: Antioch Unified School District, acting by and through its Governing Board, herein called "District".

1. Pursuant to and in compliance with your Notice Inviting Bids and other documents relating thereto, the undersigned bidder, having thoroughly studied and familiarized himself with the terms of the Contract, the local conditions affecting the performance of the Contract, the cost of the work at the place where the work is to be done, the labor market, the supply chain market for materials and equipment necessary to complete the Project, with the Drawings and Specifications, and other Contract Documents, hereby proposes and agrees to perform within the time stipulated, the Contract, including all of its component parts, and everything required to be performed, including its acceptance by the District, and to provide and furnish any and all labor, materials, tools, expendable equipment, and utility and transportation services necessary to perform the Contract and complete all of the Work in a workmanlike manner required in connection with the construction of:

BID NO. 24-25-06

Jack London Elementary Boiler and Chiller Replacement

in the District described above, all in strict conformance with the drawings and other Contract Documents on file with the Construction Manager for the District for amounts set forth herein.

2. BIDDER ACKNOWLEDGES THE FOLLOWING ADDENDUM:

| Number | Number | Number | Number | Number | Number | Number | Number |
|--------|--------|--------|--------|--------|--------|--------|--------|
| _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ |

Acknowledge the inclusion of all addenda issued prior to bid in the blanks provided above. Your failure to do so may render your bid non-responsive.

3. TOTAL CASH PURCHASE PRICE IN WORDS & NUMBERS:

_____ DOLLARS
(\$ _____)

4. TIME FOR COMPLETION: The District may give a notice to proceed within ninety (90) days of the award of the bid by the District. Once the Contractor has received the notice to proceed, the Contractor shall complete the work in the time specified in the Agreement. By submitting this bid, Contractor has thoroughly studied this Project, the labor market, and the supply chain market for materials and equipment that are necessary to complete the Project and Contractor agrees that the Contract Time for this Project is adequate for the timely and proper completion of the Project. Further, Contractor has included in the analysis of the time required for this Project, Rain Days, Governmental Delays, and the requisite time to complete Punch List.

In the event that the District desires to postpone giving the notice to proceed beyond this ninety (90) day period, it is expressly understood that with reasonable notice to the Contractor, giving the notice to proceed may be postponed by the District. It is further expressly understood by the Contractor, that the Contractor shall not be entitled to any claim of additional compensation as a result of the postponement of giving the notice to proceed.

If the Contractor believes that a postponement will cause a hardship to it, the Contractor may terminate the contract with written notice to the District within ten (10) days after receipt by the Contractor of the District's notice of postponement. Should the Contractor terminate the Contract as a result of a notice of postponement, the District shall have the authority to award the Contract to the next lowest responsible bidder, if applicable.

It is understood that the District reserves the right to reject any or all bids and/or waive any irregularities or informalities in this bid or in the bid process. The Contractor understands that it may not withdraw this bid for a period of ninety (90) days after the date set for the opening of bids.

5. Attached is bid security in the amount of not less than ten percent (10%) of the bid:

Bid bond (10% of the Bid), certified check, or cashier's check (circle one)

6. The required List of Designated Subcontractors is attached hereto.

7. The required Non-Collusion Declaration is attached hereto.

8. The Substitution Request Form, if applicable, is attached hereto.

9. It is understood and agreed that if written notice of the acceptance of this bid is mailed, telegraphed, or delivered to the undersigned after the opening of the bid, and within the time this bid is required to remain open, or at any time thereafter before this bid is withdrawn, the undersigned will execute and deliver to the District a Contract in the form attached hereto in accordance with the bid as accepted, and that he or she will also furnish and deliver to the District the Performance Bond and Payment Bond, all within five (5) calendar days after award of Contract, and that the work under the Contract shall be commenced by the undersigned bidder, if awarded the Contract, by the start date provided in the District's Notice to Proceed, and shall be completed by the Contractor in the time specified in the Contract Documents.

10. 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 the legal name of such corporation, as well as the names of the president, secretary, treasurer, and manager thereof; if a co-partnership, state the true names of the firm, as well as the names of all individual co-partners comprising the firm; if bidder or other interested person is an individual, state the first and last names in full.)

11. PROTEST PROCEDURES. If there is a bid protest, the grounds shall be submitted as set forth in the Instructions to Bidders.

12. The undersigned bidder shall be licensed and shall provide the following California Contractor's license information:

License Number: _____
License Expiration Date: _____
Name on License: _____
Class of License: _____
DIR Registration Number: _____

If the bidder is a joint venture, each member of the joint venture must include the above information.

13. Time is of the essence regarding this Contract, therefore, in the event the bidder to whom the Contract is awarded fails or refuses to post the required bonds and return executed copies of the Agreement form within five (5) calendar days from the date of receiving the Notice of Award, the District may declare the bidder's bid deposit or bond forfeited as damages.

14. The bidder declares that he/she has carefully examined the location of the proposed Project, that he/she has examined the Contract Documents, including the Plans, General Conditions, Supplemental Conditions, Addenda, and Specifications, all others documents and requirements that are attached to and/or contained in the Project Manual, all other documents issued to bidders and read the accompanying instructions to bidders, and hereby proposes and agrees, if this proposal is accepted, to furnish all materials and do all work required to complete the said work in accordance with the Contract Documents, in the time and manner therein prescribed for the unit cost and lump sum amounts set forth in this Bid Form. The undersigned bidder hereby acknowledges and agrees that such bidder shall not be entitled to any price increase to the Total Cash Purchase Price set forth above on account of or due to any external factors including, but not limited to, inflation, labor shortages, and/or supply chain issues/shortages.

15. DEBARMENT. In addition to seeking remedies for False Claims under Government Code section 12650 et seq. and Penal Code section 72, the District may debar a Contractor pursuant to Article 15 of the General Conditions if the Board, or the Board may designate a hearing officer who, in his or her discretion, finds the Contractor has done any of the following:

- a. Intentionally or with reckless disregard, violated any term of a contract with the District;
- b. Committed an act or omission which reflects on the Contractor's quality, fitness or capacity to perform work for the District;
- c. Committed an act or offense which indicates a lack of business integrity or business honesty; or
- d. Made or submitted a false claim against the District or any other public entity. (See Government Code section 12650, et seq., and Penal Code section 72)

16. DESIGNATION OF SUBCONTRACTORS. In compliance with the Subletting and Subcontracting Fair Practices Act (California Public Contract Code section 4100 et seq.) and any amendments thereof, each bidder shall list subcontractors on the District's form Subcontractor list. This subcontractor list shall be submitted with the bid and is a required form

I agree to receive service of notices at the e-mail address listed below.

I the below-indicated bidder, declare under penalty of perjury that the information provided and representations made in this bid are true and correct.

Proper Name of Company

Name of Bidder Representative

Street Address

City, State, and Zip

()

Phone Number

()

Fax Number

E-Mail

By: _____ Date: _____
Signature of Bidder Representative

NOTE: If bidder is a corporation, the legal name of the corporation shall be set forth above together with the signature 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 signature shall be placed above.

All signatures must be made in permanent blue ink.

CONTRACTOR'S CERTIFICATE REGARDING WORKERS'
COMPENSATION FORM

(form must be provided with bid documents even though an OCIP is in-place)

Labor Code section 3700 in relevant part provides:

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

1. By being insured against liability to pay compensation by one or more insurers duly authorized to write compensation insurance in this State.
2. By securing from the Director of Industrial Relations a certificate of consent to self-insure, which may be given upon furnishing proof satisfactory to the Director of Industrial Relations of ability to self-insure and to pay any compensation that may become due to employees.
3. For any county, city, city and county, municipal corporation, public district, public agency, or any political subdivision of the state, including each member of a pooling arrangement under a joint exercise of powers agreement (but not the state itself), by securing from the Director of Industrial Relations a certificate of consent to self-insure against workers' compensation claims, which certificate may be given upon furnishing proof satisfactory to the director of ability to administer workers' compensation claims properly, and to pay workers' compensation claims that may become due to its employees. On or before March 31, 1979, a political subdivision of the state which, on December 31, 1978, was uninsured for its liability to pay compensation, shall file a properly completed and executed application for a certificate of consent to self-insure against workers' compensation claims. The certificate shall be issued and be subject to the provisions of Section 3702.

I am aware of the provisions of Labor Code section 3700 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 provision before commencing the performance of the work of this Contract.

(Signature)

(Print)

(Date)

In accordance with Article 5 (commencing at section 1860), Chapter 1, Part 7, Division 2 of the Labor Code, the above certificate must be signed and submitted with the Contractor's bid.

NON-COLLUSION DECLARATION

The undersigned declares:

I am the _____ [Title] of _____ [Name of Company], 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].

Signed: _____

Typed Name: _____

BID GUARANTEE FORM

(Use only when not using a Bid Bond)

Accompanying this proposal is a cashier's check payable to the order of the Antioch Unified School District or a certified check payable to the order of the Antioch Unified School District in an amount equal to ten percent (10%) of the base bid and alternates (\$_____).

The proceeds of this check shall become the property of said District, if, this proposal shall be accepted by the District through the District's Governing Board, and the undersigned fails to execute a Contract with and furnish the sureties required by the District within the required time; otherwise, said check is to be returned to the undersigned.

Bidder

Note: Use this form, in lieu of Bid Bond form, when a cashier's check or certified check is accompanying the bid

BID BOND FORM

KNOW ALL MEN BY THESE PRESENT that we, the undersigned, (hereafter called "Principal"), and _____ (hereafter called "Surety"), are hereby held and firmly bound unto the Antioch Unified School District (hereafter called "District") in the sum of _____ (\$_____) for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors, and assigns.

SIGNED this _____ day of _____, 20__.

The condition of the above obligation is such that whereas the Principal has submitted to the District a certain Bid, attached hereto and hereby made a part hereof, to enter into a Contract in _____ writing _____ for _____ the _____ construction _____ of _____.

NOW, THEREFORE,

- a. If said Bid is rejected, or
- b. If said Bid is accepted and the Principal executes and delivers a Contract or the attached Agreement form within five (5) calendar days after acceptance (properly completed in accordance with said Bid), and furnishes bonds for his faithful performance of said Contract and for payment of all persons performing labor or furnishing materials in connection therewith,

Then this obligation shall be void; otherwise, the same shall remain in force and effect.

Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the Contract, or the call for bids, or the work to be performed thereunder, or the specifications accompanying the same, shall in anyway 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 the work, or to the specifications.

In the event suit is brought upon this bond by the District and judgment is recovered, the Surety shall pay all costs incurred by the District in such suit, including without limitation, attorneys' fees to be fixed by the court.

IN WITNESS WHEREOF, Principal and Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, on the day and year first set forth above.

(Corporate Seal)

By _____
Principal's Signature

Typed or Printed Name

Principal's Title

(Corporate Seal)

By _____
Surety's Signature

Typed or Printed Name

Title

(Attached Attorney in Fact Certificate)

Surety's Name

Surety's Address

Surety's Phone Number

IMPORTANT:

Surety companies executing bonds must possess a certificate of authority from the California Insurance Commissioner authorizing them to write surety insurance defined in California Insurance Code section 105, and if the work or project is financed, in whole or in part, with federal, grant, or loan funds, it must also appear on the Treasury Department's most current list (Circular 570 as amended).

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).

REQUEST FOR SUBSTITUTION AT TIME OF BID

Pursuant to Public Contract Code section 3400, bidder submits the following request to Substitute with the bid that is submitted. I understand that if the request to substitute is not an “or equal” or is not accepted by District and I answer “no” I will not provide the specified item, then I will be held non-responsive and my bid will be rejected. With this understanding, I hereby request Substitution of the following articles, devices, equipment, products, materials, fixtures, patented processes, forms, methods, or types of construction:

| | Specification Section | Specified Item | Requested Substituted Item | Contractor Agrees to Provide Specified Item if request to Substitute is Denied ¹ (circle one) | District Decision (circle one) |
|-----|-----------------------|----------------|----------------------------|--|--------------------------------|
| 1. | | | | Yes No | Grant Deny |
| 2. | | | | Yes No | Grant Deny |
| 3. | | | | Yes No | Grant Deny |
| 4. | | | | Yes No | Grant Deny |
| 5. | | | | Yes No | Grant Deny |
| 6. | | | | Yes No | Grant Deny |
| 7. | | | | Yes No | Grant Deny |
| 8. | | | | Yes No | Grant Deny |
| 9. | | | | Yes No | Grant Deny |
| 10. | | | | Yes No | Grant Deny |
| 11. | | | | Yes No | Grant Deny |
| 12. | | | | Yes No | Grant Deny |

This Request Form must be accompanied by evidence as to whether the proposed Substitution (1) is equal in quality, service, and ability to the Specified Item; (2) will entail no change in detail, construction, and scheduling of related work; (3) will be acceptable in consideration of the required design and artistic

¹ Bidder must state whether bidder will provide the Specified Item in the event the Substitution request is evaluate and denied. If bidder states that bidder will not provide the Specified Item the denial of a request to Substitute shall result in the rejection of the bidder as non-responsive. However, if bidder states that bidder will provide the Specified Item in the event that bidder’s request for Substitution is denied, bidder shall execute the Agreement and provide the Specified Item(s). If bidder refuses to execute the Agreement due to the District’s decision to require the Specified Item(s) at no additional cost, bidder’s Bid Bond shall be forfeited.

effect; (4) will provide no cost disadvantage to the District; (5) will require no excessive or more expensive maintenance, including adequacy and availability of replacement parts; (6) will require no change of the construction schedule or milestones for the Project; and, (7) Contractor agrees to pay for any DSA Fees or other Governmental Plan check costs associated with this Substitution Request. (See General Conditions Section 3.6)

The undersigned states that the following paragraphs are correct:

1. The proposed Substitution does not affect the dimensions shown on the Drawings.
2. The undersigned will pay for changes to the building design, including Architect, engineering, or other consultant design, detailing, DSA plan check or other governmental plan check costs, and construction costs caused by the requested substitution.
3. The proposed substitution will have no adverse effect on other trades, the Contract Time, or specified warranty requirements.
4. Maintenance and service parts will be available locally for the proposed substitution.
5. In order for the Architect to properly review the substitution request, within five (5) days following the opening of bids, the Contractor shall provide samples, test criteria, manufacturer information, and any other documents requested by Architect or Architect's engineers or consultants, including the submissions that would ordinarily be required under Article 3.7 for Shop Drawings along with a document which provides a side by side comparison of key characteristics and performance criteria (often known as a CSI side by side comparison chart).
6. If Substitution Request is accepted by the District, Contractor is still required to provide a Submittal for the substituted item pursuant to Article 3.7 and shall provide required Schedule information (including schedule fragnets, if applicable) for the substituted item as required under Article 8.3.2.1. The approval of the Architect, Engineer, or District of the substitution request does not mean that the Contractor is relieved of Contractor's responsibilities for Submittals, Shop Drawings, and schedules under Article 3.7 and 8.3.2 if the Contractor is awarded the Project.

Name of Bidder: _____

By: _____

District: _____

By: _____

ACKNOWLEDGMENT OF BIDDING PRACTICES REGARDING INDEMNITY FORM

TO: Antioch Unified School District

RE: Project Number _____

Construction Contract for _____

Please be advised that with respect to the above-referenced Project the undersigned Contractor on behalf of itself and all subcontractors hereby waives the benefits and protection of Labor Code section 3864, which provides:

“If an action as provided in this chapter is prosecuted by the employee, the employer, or both jointly against the third person results in judgment against such third person, the employer shall have no liability to reimburse or hold such third person harmless on such judgment or settlement in the absence of a written agreement to do so executed prior to the injury.”

This Agreement has been signed by an authorized representative of the contracting party and shall be binding upon its successors and assignees. The undersigned further agrees to promptly notify the District of any changes of ownership of the contracting party or any subcontractor while this Agreement is in force.

Contracting Party

Name of Agent/Title

DISABLED VETERAN BUSINESS ENTERPRISE (DVBE) PARTICIPATION
STATEMENT

Each bidder must complete this form in order to comply with the Antioch Unified School District ("District") policy for participation of disabled veteran business enterprises (School District projects funded in whole or in part by the State of California pursuant to the Leroy F. Greene School Facilities Act of 1998. (Education Code §17070.10, *et seq.*)

Project Name: _____

Bid No.: _____

DSA No.: _____

The undersigned, on behalf of the Contractor named below, certifies that the Contractor has made reasonable efforts to secure participation by DVBE in the Contract to be awarded for the above-referenced Bid No., including participation by DVBE subcontractors and/or material suppliers. **Check only one of the following:**

- ☐ The Contractor was unable after reasonable efforts to secure DVBE participation in the Contract for the above-referenced Project/Bid No. However, the Contractor will use DVBE services if the opportunity arises at any time during construction of the Project. Upon completion of the Project, the Contractor will report to the District the total dollar amount of DVBE participation in any Contract awarded to Contractor, and in any change orders, for the above-referenced Project.
- ☐ The Contractor has secured DVBE participation in the Contract for the above referenced Project/Bid No., and anticipates that such DVBE participation will equal approximately _____ dollars (\$ _____), which represents approximately _____ percent (____%) of the total Contract for such Project. Upon completion of the Project, Contractor will report to the District the actual total dollar amount of DVBE participation in the Contract awarded to Contractor, and in any change orders, for such Project

Company: _____

Name: _____

Title: _____

Signature: _____

Date: _____

CONTRACTOR'S CERTIFICATE REGARDING DRUG-FREE WORKPLACE

This Drug-Free Workplace Certification form is required from all successful bidders pursuant to the requirements mandated by Government Code section 8350 et seq., the Drug-Free Workplace Act of 1990. The Drug-Free Workplace Act of 1990 requires that every person or organization awarded a contract or grant for the procurement of any property or service from any State agency must certify that it will provide a drug-free workplace by performing 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 of the contract or grant, 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:

1. Publishing a statement, notifying employees that the unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance is prohibited in the person's or organization's workplace, and specifying actions which will be taken against employees for violations of the prohibition.
2. Establishing a drug-free awareness program to inform employees about all of the following:
 - a. The dangers of drug abuse in the workplace;
 - b. The person's or organization's policy of maintaining a drug-free workplace;
 - c. The availability of drug counseling, rehabilitation and employee-assistance programs; and
 - d. The penalties that may be imposed upon employees for drug abuse violations;
3. 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.

I, the undersigned, agree to fulfill the terms and requirements of Government Code section 8355 listed above and will (a) publish a statement notifying employees concerning the prohibition of controlled substance at the workplace, (b) establish a drug-free awareness program, and (c) require each employee engaged in the performance of the contract be given a copy of the statement required by section 8355(a) and require such employee agree to abide by the terms of that statement.

I also understand that if the Antioch Unified School 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, that the contract awarded herein is subject to termination, suspension of payments, or both. I further understand that, should I violate the terms of the Drug-Free Workplace Act of 1990, I may be subject to debarment in accordance with the requirements of Section 8350 et seq. 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.

DATE: _____

CONTRACTOR

By: _____
Signature

**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, of any kind and at any time, in 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

**IRAN CONTRACTING ACT CERTIFICATION
OF ELIGIBILITY TO PROPOSAL FOR
CONTRACTS OF \$ 1 MILLION OR MORE
(Public Contract Code sections 2202-2208)**

Pursuant to Public Contract Code 2204. (a) A public entity shall require a person that submits a proposal or proposal to, or otherwise proposes to enter into or renew a contract with, a public entity with respect to a contract for goods or services of one million dollars (\$1,000,000) or more to certify, at the time the proposal 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 (b) of Section 2202.5, as applicable. A state agency shall submit the certification information to the Department of General Services.

To comply with this requirement, please insert your Contractor or financial institution name and Federal ID Number (if available) and complete **one** of the options below. Please note: California law establishes 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 proposal on contracts. (Public Contract Code section 2205.)

OPTION #1 – CERTIFICATION

I, the official named below, certify I am duly authorized to execute this certification on behalf of the Contractor/financial institution identified below, and the Contractor/financial institution 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/vendor, for 45 days or more, if that other person/vendor 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.

| | |
|---|-----------------------------------|
| <i>Contractor Name/Financial Institution</i> | <i>Federal ID Number (or n/a)</i> |
| <i>By (Authorized Signature)</i> | |
| <i>Printed Name and Title of Person Signing</i> | |
| <i>Date Executed</i> | <i>Executed in</i> |

OPTION #2 – EXEMPTION

Pursuant to Public Contract Code sections 2203(c) and (d), a public entity may permit a contractor/financial institution engaged in investment activities in Iran, on a case-by-case basis, to be eligible for, or to proposal 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.

| | |
|---|-----------------------------------|
| <i>Contractor Name/Financial Institution</i> | <i>Federal ID Number (or n/a)</i> |
| <i>By (Authorized Signature)</i> | |
| <i>Printed Name and Title of Person Signing</i> | <i>Date Executed</i> |

FLEET COMPLIANCE CERTIFICATION

Bidder hereby acknowledges that they have reviewed the California Air Resources Board's policies, rules and regulations and are familiar with the requirements of Title 13, California Code of Regulations, Division 3, Chapter 9, effective on January 1, 2024 (the "Regulation"). Bidder hereby certifies, subject to penalty for perjury, that the option checked below relating to the Bidder's fleet, and/or that of their subcontractor(s) ("Fleet") is true and correct:

- ☐ The Fleet is subject to the requirements of the Regulation, and the appropriate Certificate(s) of Reported Compliance have been attached hereto.
- ☐ The Fleet is exempt from the Regulation under section 2449.1(f)(2), and a signed description of the subject vehicles, and reasoning for exemption has been attached hereto.
- ☐ Bidder and/or their subcontractor is unable to procure R99 or R100 renewable diesel fuel as defined in the Regulation pursuant to section 2449.1(f)(3). Bidder shall keep detailed records describing the normal refueling methods, their attempts to procure renewable diesel fuel and proof that shows they were not able to procure renewable diesel (i.e. third party correspondence or vendor bids).
- ☐ The Fleet is exempt from the requirements of the Regulation pursuant to section 2449(i)(4) because this Project has been deemed an Emergency, as defined under section 2449(c)(18). Bidder shall only operate the exempted vehicles in the emergency situation and records of the exempted vehicles must be maintained, pursuant to section 2449(i)(4).
- ☐ The Fleet does not fall under the Regulation or are otherwise exempted and a detailed reasoning is attached hereto.

Name of Bidder: _____

Signature: _____

Name: _____

Title: _____

Date: _____

[End of Bid Documents to be Submitted with Bid]

AGREEMENT FORM

THIS AGREEMENT, entered into this ____ day of _____, 20__ in the County of Contra Costa, State of California, by and between the Antioch Unified School District, hereinafter called the “District”, and _____, hereinafter called the “Contractor”.

WITNESSETH that the District and the Contractor for the consideration stated herein agree as follows:

ARTICLE 1 - SCOPE OF WORK: The Contractor shall furnish all labor, materials, equipment, tools, and utility and transportation services, and perform and complete all work required in connection with Kinder and Upper Playground Replacement (“Project”) in strict accordance with the Contract Documents enumerated in Article 7 below. The Contractor shall be liable to the District for any damages arising as a result of a failure to comply with that obligation, and the Contractor shall not be excused with respect to any failure to so comply by an act or omission of the Architect, Engineer, Inspector, Division of the State Architect (DSA), 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 seven (7) days of the date of occurrence of such act or omission preventing the Contractor from fully complying with the Contract Documents.

ARTICLE 2 - TIME OF COMPLETION: The District may give notice to proceed within ninety (90) days of the award of the bid by the District. Once the Contractor has received a notice to proceed, the Contractor shall reach Substantial Completion (See Article 1.1.46) of the Work within 261 calendar days from receipt of the Notice to Proceed and/or Notice of Award. This shall be called Contract Time. (See Article 8.1.1). It is expressly understood that time is of the essence.

Contractor has thoroughly studied the Project, the labor market, and the supply chain market for materials and equipment that are necessary to complete the Project, and has satisfied itself that the time period for this Project was adequate for the timely and proper completion of the Project within each milestone and within the Contract time. Further, Contractor has included in the analysis of the time required for this Project, items set forth in General Conditions Article 8.3.2.1, Submittal Schedules, Rain Day Float, and Governmental Delay Float.

In the event that the District desires to postpone giving the notice to proceed beyond this ninety (90) day period, it is expressly understood that with reasonable notice to the Contractor, giving the notice to proceed may be postponed by the District. It is further expressly understood by the Contractor, that the Contractor shall not be entitled to any claim of additional compensation as a result of the District’s postponement of giving the notice to proceed.

If the Contractor believes that a postponement will cause hardship to it, the Contractor may terminate the Contract with written notice to the District within ten (10) days after receipt by the Contractor of the District’s notice of postponement. It is further understood by the Contractor that in the event that the Contractor terminates the Contract as a result of postponement by the District, the District shall only be obligated to pay the Contractor for the work performed by the Contractor at the time of notification of

postponement. Should the Contractor terminate the Contract as a result of a notice of postponement, the District shall have the authority to award the Contract to the next lowest responsible bidder.

ARTICLE 3 - LIQUIDATED DAMAGES: It being impracticable and infeasible to determine the amount of actual damage, it is agreed that the Contractor will pay the District the sum of five hundred dollars and zero cents (\$500.00) per calendar day for each and every day of delay beyond the Contract Time set forth in Article 2 of this Agreement (inclusive of Milestones that are critical on the critical path or noted as critical to the District) as liquidated damages and not as a penalty or forfeiture. In the event Liquidated Damages are not paid, the Contractor further agrees that the District may deduct such amount thereof from any money due or that may become due the Contractor under the Contract (See Article 9.6 and 2.2 of the General Conditions).

ARTICLE 4 - CONTRACT PRICE: The District shall pay to the Contractor as full consideration for the faithful performance of the Contract, subject to any additions or deductions as provided in the Contract Documents, the sum of _____ DOLLARS (\$ _____), said sum being the total amount stipulated in the Bid Contractor submitted. Payment shall be made as set forth in the General Conditions.

Should any Change Order result in an increase in the Contract Price, the cost of such Change Order shall be agreed to in advance by the Contractor and the District, subject to the monetary limitations set forth in Public Contract Code section 20118.4. In the event that the Contractor proceeds with a Change in work without an agreement between the District and Contractor regarding the cost of a Change Order, the Contractor waives any Claim of additional compensation for such additional work. In no event shall the Contractor be entitled to increase the Contract Price set forth above on account of any external factors including, but not limited to, inflation, labor shortages, and/or supply chain issues/shortages.

ARTICLE 5 - HOLD HARMLESS AGREEMENT: Contractor shall defend, indemnify and hold harmless District, Architect, Inspector, the State of California and their officers, employees, agents and independent contractors from any and all liabilities, claims, actions, liens, judgments, demands, damages, losses, costs or expenses of any kind arising from death, personal injury, property damage or other cause based or asserted upon any act, omission, or breach connected with or arising from the progress of Work or performance of service under this Agreement or the Contract Documents. As part of this indemnity, Contractor shall protect and defend, at its own expense, District, Architect, Construction Manager, Inspector, the State of California and their officers, employees, agents and independent contractors from any legal action including attorney's fees or other proceeding based upon such act, omission, breach or as otherwise required by this Article.

Furthermore, Contractor agrees to and does hereby defend, indemnify and hold harmless District, Architect, Construction Manager, Inspector, the State of California and their officers, employees, agents and independent contractors from every claim or demand made, and every liability, loss, damage, expense or attorney's fees of any nature whatsoever, which may be incurred by reason of:

(a) Liability for (1) death or bodily injury to persons; (2) damage or injury to, loss (including theft), or loss of use of, any property; (3) any failure or alleged failure to comply with any provision of law or the Contract Documents; or (4) any other loss, damage or expense, sustained by any person, firm or corporation or in connection with the Work called for in this Agreement or the Contract Documents, except for liability resulting from the sole or active negligence, or the willful misconduct of the District.

(b) Any bodily injury to or death of persons or damage to property caused by any act, omission or breach of Contractor or any person, firm or corporation employed by Contractor, either directly or by independent contract, including all damages or injury to or death of persons, loss (including theft) or loss of use of any property, sustained by any person, firm or corporation, including the District, arising out of or in any way connected with Work covered by this Agreement or the Contract Documents, whether said injury or damage occurs either on or off District property, but not for any loss, injury, death or damages caused by the sole or active negligence or willful misconduct of the District.

(c) Any dispute between Contractor and Contractor's subcontractors/suppliers/Sureties, including, but not limited to, any failure or alleged failure of the Contractor (or any person hired or employed directly or indirectly by the Contractor) to pay any Subcontractor or Materialman of any tier or any other person employed in connection with the Work and/or filing of any stop notice or mechanic's lien claims.

(d) Any claims, allegations, penalties, assessments, or liabilities to the extent caused by the Contractor's failure or the failure of any Subcontractor of any tier, to fully comply with the DIR registration requirements under Labor Code section 1725.5 at all times during the performance of any Work on the Project and shall reimburse the District for any penalties assessed against the District arising from any failure by the Contractor or any Subcontractor of any tier from complying with Labor Code sections 1725.5 and 1771.1. Nothing in this paragraph, however, shall require the Contractor or any Subcontractor to be liable to the District or indemnify the District for any penalties caused by the District in accordance with Labor Code section 1773.3 (g).

Contractor, at its own expense, cost, and risk, shall defend, with counsel of the District's choosing, any and all claims, actions, suits, or other proceedings that may be brought or instituted against the District, its officers, agents or employees, on account of or founded upon any cause, damage, or injury identified herein Article 5 and shall pay or satisfy any judgment that may be rendered against the District, its officers, agents or employees in any action, suit or other proceedings as a result thereof.

The Contractor's and Subcontractors' obligation to defend, indemnify and hold harmless the Owner, Architect, Inspector, the State of California and their officers, employees, agents and independent contractors hereunder shall include, without limitation, any and all claims, damages, and costs for the following: (1) any damages or injury to or death of any person, and damage or injury to, loss (including theft), or loss of use of, any property; (2) breach of any warranty, express or implied; (3) failure of the Contractor or Subcontractors to comply with any applicable governmental law, rule, regulation, or other requirement; (4) products installed in or used in connection with the Work; and (5) any claims of violation of the Americans with Disabilities Act ("ADA").

Contractor shall reimburse Owner, Architect, Inspector, the State of California and their officers, employees, agents and independent contractors 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. Such indemnification shall extend to all claims, demands, or liabilities occurring after completion of the Project as well as during the progress of the Work.

This Hold Harmless Agreement shall survive termination of this Agreement, for any reason whatsoever, and binds each party's legal representatives, successors, and assigns.

ARTICLE 6 - PROVISIONS REQUIRED BY LAW: Each and every provision of law and clause required to be inserted in this Contract shall be deemed to be inserted herein, and this Contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted or is not inserted correctly, then upon application of either party the Contract shall forthwith be physically amended to make such insertion or correction.

ARTICLE 7 - COMPONENT PARTS OF THE CONTRACT: The Contract entered into by this Agreement consists of the following Contract Documents, all of which are component parts of the Contract as if herein set out in full or attached hereto.

Notice Inviting Bids
Instructions to Bidders
Designation of Subcontractors
Non-Collusion Declaration
Bid Guarantee Form
Bid Bond
Bid Form
Contractor's Certificate Regarding Worker's Compensation
Acknowledgment of Bidding Practices Regarding Indemnity
DVBE Participation Statement and Close-Out Forms
Agreement Form
Payment Bond
Performance Bond
Guarantee
Escrow Agreement for Security Deposit In Lieu of Retention
Workers' Compensation/Employers Liability Endorsement
General Liability Endorsement
Automobile Liability Endorsement
Contractor's Certificate Regarding Drug-Free Workplace
Contractor's Certificate Regarding Alcohol and Tobacco
Iran Contracting Act Certification Form
Fleet Compliance Certification Form
Contractor's Certificate Regarding Background Checks
General Conditions
Supplementary and Special Conditions
Specifications
All Addenda as Issued
Drawings/Plans
Substitution Request Form
Requirements, Reports and/or any other Documents in the Project Manual or Other Documents Issued to Bidders

All of the above named Contract Documents are intended to be complementary. Work required by one of the above named Contract Documents and not by others shall be done as if required by all.

ARTICLE 8 - PREVAILING WAGES: Wage rates for this Project shall be in accordance with the general prevailing rate of holiday and overtime work in the locality in which the work is to be performed for each craft, classification, or type of work needed to execute the Contract as determined by the Director of the Department of Industrial Relations. Copies of schedules of rates so determined by the Director of the

Department of Industrial Relations are on file at the administrative office of the District and are also available from the Director of the Department of Industrial Relations. Monitoring and enforcement of the prevailing wage laws and related requirements will be performed by the Labor Commissioner/ Department of Labor Standards Enforcement (DLSE).

The following are hereby referenced and made a part of this Agreement and Contractor stipulates to the provisions contained therein.

1. Chapter 1 of Part 7 of Division 2 of the Labor Code (Section 1720 et seq.)
2. California Code of Regulations, Title 8, Chapter 8, Subchapters 3 through 6 (Section 16000 et seq.)

ARTICLE 9 - RECORD AUDIT: In accordance with Government Code section 8546.7 (and Davis Bacon, if applicable) and Article 13.11 of the General Conditions, records of both the District and the Contractor shall be subject to examination and audit for a period of five (5) years after a Final Retention Payment or the Recording of a Notice of Completion, whichever occurs first.

ARTICLE 10 - CONTRACTOR'S LICENSE: The Contractor must possess throughout the Project a Class A and/or Class B Contractor's License, issued by the State of California, which must be current and in good standing.

(REMAINDER OF PAGE INTENTIONALLY LEFT BLANK)

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

DISTRICT:

CONTRACTOR:

Typed or Printed Name

Typed or Printed Name

Title

Title

Signature

Signature

Dated: _____

Type or Printed Name

Title (Authorized Officers or Agents)

Signature

(CORPORATE SEAL)

PAYMENT BOND
(CALIFORNIA PUBLIC WORK)

KNOW ALL MEN BY THESE PRESENTS:

THAT WHEREAS, the ANTIOCH UNIFIED SCHOOL DISTRICT (sometimes referred to hereinafter as "Obligee") has awarded to _____ (hereinafter designated as the "Principal" or "Contractor"), an agreement for the work described as follows: _____ (hereinafter referred to as the "Public Work"); and

WHEREAS, said Contractor is required to furnish a bond in connection with said Contract, and pursuant to California Civil Code section 9550;

NOW, THEREFORE, We, _____, the undersigned Contractor, as Principal; and _____, a corporation organized and existing under the laws of the State of _____, and duly authorized to transact business under the laws of the State of California, as Surety, are held and firmly bound unto the ANTIOCH UNIFIED SCHOOL DISTRICT and to any and all persons, companies, or corporations entitled by law to file stop notices under California Civil Code section 9100, or any person, company, or corporation entitled to make a claim on this bond, in the sum of _____ Dollars (\$ _____), such sum being not less than one hundred percent (100%) of the total amount payable by said Obligee under the terms of said Contract, for which payment will 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 said Principal, its heirs, executors, administrators, successors, or assigns, or subcontractor, shall fail to pay any person or persons named in Civil Code section 9100; or 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 for amounts due under the Unemployment Insurance Code, with respect to work or labor thereon of any kind; or shall fail to deduct, withhold, and pay over to the Employment Development Department, any amounts required to be deducted, withheld, and paid over by Unemployment Insurance Code section 13020 with respect to work and labor thereon of any kind, then said Surety will pay for the same, in an amount not exceeding the amount herein above set forth, and in the event suit is brought upon this bond, also will pay such reasonable attorneys' fees as shall be fixed by the court, awarded and taxed as provided in California Civil Code section 9550 et seq.

This bond shall inure to the benefit of any person named in Civil Code section 9100 giving such person or his/her assigns a right of action in any suit brought upon this bond.

It is further stipulated and agreed that the Surety of this bond shall not be exonerated or released from the obligation of the bond by any change, extension of time for performance, addition, alteration or modification in, to, or of any contract, plans, or 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 therefor; nor by any change or modification of any terms of payment or extension of time for payment pertaining or relating to any scheme or work of improvement herein above described;

nor by any 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 the Surety be released from liability to those for whose benefit such bond has been given, by reason of any breach of contract between the Obligee and the Contractor or on the part of any obligee named in such bond; that the sole condition of recovery shall be that the claimant is a person described in California Civil Code section 9100, and who has not been paid the full amount of his or her claim; and that the Surety does hereby waive notice of any such change, extension of time, addition, alteration or modification herein mentioned.

IN WITNESS WHEREOF this instrument has been duly executed by the Principal and Surety above named, on the _____ day of _____, 20__.

PRINCIPAL/CONTRACTOR:

By: _____

SURETY:

By: _____

Attorney-in-Fact

IMPORTANT: THIS IS A REQUIRED FORM.

Surety companies executing bonds must possess a certificate of authority from the California Insurance Commissioner authorizing them to write surety insurance defined in California Insurance Code section 105, and if the work or project is financed, in whole or in part, with federal, grant or loan funds, Surety's name must also appear on the Treasury Department's most current list (Circular 570 as amended).

Any claims under this bond may be addressed to:

(Name and Address of Surety)

(Name and Address of agent or representative for
service for service of process in California)

Telephone: _____

Telephone: _____

| |
|---|
| A notary public or other office 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)
) ss.
COUNTY OF)

On _____, before me, _____,
personally appeared _____, who proved 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) as the Attorney-in-Fact
of _____ (Surety) and acknowledged to me that by his/her/their signature(s)
on the instrument the person(s), or the entity upon behalf of which the person(s) 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.

Notary Public in and for said State

(SEAL)

Commission expires: _____

NOTE: A copy of the power-of-attorney to local representatives of the bonding company must be
attached hereto.

PERFORMANCE BOND
(CALIFORNIA PUBLIC WORK)

KNOW ALL MEN BY THESE PRESENTS:

THAT WHEREAS, the ANTIOCH UNIFIED SCHOOL DISTRICT (sometimes referred to hereinafter as "Obligee") has awarded to _____ (hereinafter designated as the "Principal" or "Contractor"), an agreement for the work described as follows: _____ (hereinafter referred to as the "Public Work"); and

WHEREAS, the work to be performed by the Contractor is more particularly set forth in that certain contract for said Public Work dated _____, (hereinafter referred to as the "Contract"), which Contract is incorporated herein by this reference; and

WHEREAS, the Contractor is required by said Contract to perform the terms thereof and to provide a bond both for the performance and guaranty thereof.

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

THE CONDITION OF THIS OBLIGATION IS SUCH THAT, if the bounded Contractor, his or her 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 said Contract and any alteration thereof made as therein provided, on his or her 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 guarantees of all materials and workmanship; and indemnify, defend and save harmless the Obligee, its officers and agents, as stipulated in said Contract, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect.

The Surety, for value received, hereby stipulates and agrees that it shall not be exonerated or released from the obligation of this bond (either by total exoneration or pro tanto) by any change, extension of time, alteration in or addition to the terms of the contract or to the work to be performed there under or the specifications accompanying the same, nor by any change or modification to any terms of payment or extension of time for any payment pertaining or relating to any scheme of work of improvement under the contract. Surety also stipulates and agrees that it shall not be exonerated or released from the obligation of this bond (either by total exoneration or pro tanto) by any overpayment or underpayment by the Obligee that is based upon estimates approved by the Architect. The Surety stipulates and agrees that none of the aforementioned changes, modifications, alterations, additions, extension of time or actions shall in any way affect its obligation on this bond, and it does hereby waive notice of any such changes, modifications,

alterations, additions or extension of time to the terms of the contract, or to the work, or the specifications as well notice of any other actions that result in the foregoing.

Whenever Principal shall be, and is declared by the Oblige to be, in default under the Contract, the Surety shall promptly either remedy the default, or shall promptly take over and complete the Contract through its agents or independent contractors, subject to acceptance and approval of such agents or independent contractors by Oblige as hereinafter set forth, in accordance with its terms and conditions and to pay and perform all obligations of Principal under the Contract, including, without limitation, all obligations with respect to warranties, guarantees and the payment of Liquidated Damages; or, at Oblige's sole discretion and election, Surety shall obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by Oblige of the lowest responsible bidder, arrange for a contract between such bidder and the Oblige and make available as Work progresses (even though there should be a default or succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the "balance of the Contract Price" (as hereinafter defined), and to pay and perform all obligations of Principal under the Contract, including, without limitation, all obligations with respect to warranties, guarantees and the payment of Liquidated Damages. The term "balance of the Contract Price," as used in this paragraph, shall mean the total amount payable to Principal by the Oblige under the Contract and any modifications thereto, less the amount previously paid by the Oblige to the Principal, less any withholdings by the Oblige allowed under the Contract. Oblige shall not be required or obligated to accept a tender of a completion contractor from the Surety.

Surety expressly agrees that the Oblige may reject any agent or contractor which may be proposed by Surety in fulfillment of its obligations in the event of default by the Principal. Unless otherwise agreed by Oblige, in its sole discretion, Surety shall not utilize Principal in completing the Contract nor shall Surety accept a bid from Principal for completion of the work in the event of default by the Principal.

No final settlement between the Oblige and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

The Surety shall remain responsible and liable for all patent and latent defects that arise out of or relate to the Contractor's failure and/or inability to properly complete the Public Work as required by the Contract and the Contract Documents. The obligation of the Surety hereunder shall continue so long as any obligation of the Contractor remains.

Contractor and Surety agree that if the Oblige is required to engage the services of an attorney in connection with enforcement of the bond, Contractor and Surety shall pay Oblige's reasonable attorneys' fees incurred, with or without suit, in addition to the above sum.

In the event suit is brought upon this bond by the Oblige and judgment is recovered, the Surety shall pay all costs incurred by the Oblige in such suit, including reasonable attorneys' fees to be fixed by the Court.

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

PRINCIPAL/CONTRACTOR:

By: _____

SURETY:

By: _____

Attorney-in-Fact

The rate of premium on this bond is _____ per thousand.

The total amount of premium charged: \$ _____ (This must be filled in by a corporate surety).

IMPORTANT: THIS IS A REQUIRED FORM.

Surety companies executing bonds must possess a certificate of authority from the California Insurance Commissioner authorizing them to write surety insurance defined in California Insurance Code section 105, and if the work or project is financed, in whole or in part, with federal, grant or loan funds, Surety's name must also appear on the Treasury Department's most current list (Circular 570 as amended).

Any claims under this bond may be addressed to:

(Name and Address of Surety)

(Name and Address of agent or representative for service for service of process in California)

Telephone: _____

Telephone: _____

A notary public or other office 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)
) ss.
COUNTY OF)

On _____, before me, _____,
personally appeared _____, who proved 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) as the Attorney-in-Fact
of _____ (Surety) and acknowledged to me that by his/her/their signature(s)
on the instrument the person(s), or the entity upon behalf of which the person(s) 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.

Notary Public in and for said State

(SEAL)

Commission expires: _____

NOTE: A copy of the power-of-attorney to local representatives of the bonding company must be
attached hereto.

GUARANTEE

Guarantee for _____ . We hereby guarantee that the _____, which we have installed in _____ has been done in accordance with the Contract Documents, including without limitation, the drawings and specifications, and that the work as installed will fulfill the requirements included in the bid documents. The undersigned and its surety agrees to repair or replace any or all such work, together with any other adjacent work, which may be displaced in connection with such replacement, that may prove to be defective in workmanship or material within a period of one (1) year from the date of the Notice of Completion of the above-mentioned structure by the Antioch Unified School District, ordinary wear and tear and unusual abuse or neglect excepted.

In the event the undersigned or its surety fails to comply with the above-mentioned conditions within a reasonable period of time, as determined by the District, but not later than ten (10) days after being notified in writing by the District or within forty eight (48) hours in the case of an emergency or urgent matter, the undersigned and its surety authorizes the District to proceed to have said defects repaired and made good at the expense of the undersigned and its surety, who will pay the costs and charges therefor upon demand. The undersigned and its surety shall be jointly and severally liable for any costs arising from the District's enforcement of this Guarantee.

Countersigned

(Proper Name)

(Proper Name)

By: _____

By: _____

(Signature of Subcontractor or Contractor)

(Signature of General Contractor if for Subcontractor)

Representatives to be contacted for service:

Name: _____

Address: _____

Phone Number: _____

ESCROW AGREEMENT FOR SECURITY DEPOSITS IN LIEU OF RETENTION

This Escrow Agreement is made and entered into by and between the Antioch Unified School District, 510 G Street, Antioch, CA 94509, hereinafter called "Owner", and _____ whose address is _____, hereinafter called "Contractor", and _____ whose address is _____, hereinafter called "Escrow Agent".

For the consideration hereinafter set forth, the Owner, Contractor and Escrow Agent agree as follows:

1. Pursuant to Section 22300 of the Public Contract Code of the State of California, Contractor has the option to deposit securities with Escrow Agent as a substitute for Retention earnings required to be withheld by Owner pursuant to the Construction Contract entered into between the Owner and Contractor for _____ in the amount of _____ dated _____ (hereinafter referred to as the "Contract"). Alternatively, on written request of the Contractor, the Owner shall make payments of the Retention earnings directly to the escrow agent. When Contractor deposits the securities as a substitute for Contract earnings, the Escrow Agent shall notify the Owner within ten (10) days of deposit. The market value of the securities at the time of the substitution shall be at least equal to the cash amount then required to be withheld as Retention under the terms of the Contract between the Owner and Contractor. Securities shall be held in the name of the Owner, and shall designate the Contractor as beneficial owner.
2. The Owner shall make progress payments to the Contractor for such funds which otherwise would be withheld from progress payments pursuant to the Contract provisions, provided that the Escrow Agent holds securities in the form and amount specified above.
3. When the Owner makes payments of Retentions earned directly to the Escrow Agent, the Escrow Agent shall hold them for the benefit of the Contractor until such time as the escrow created under this Contract is terminated. The Contractor may direct the investment of the payments into securities. All terms and conditions of this Agreement and the rights and responsibilities of the parties shall be equally applicable and binding when the Owner pays the Escrow Agent directly.
4. Contractor shall be responsible for paying all fees for the expenses incurred by Escrow Agent in administering the Escrow Account and all expenses of the Owner. These expenses and payment terms shall be determined by the Owner, Contractor, and Escrow Agent.
5. The interest earned on the securities or the money market accounts held in escrow and all interest earned on that interest shall be for the sole account of Contractor and shall be subject to withdrawal by Contractor at any time and from time to time without notice to the Owner.
6. Contractor shall have the right to withdraw all or any part of the principal in the Escrow Account only by written notice to Escrow Agent accompanied by written authorization from the Owner to the Escrow Agent that Owner consents to the withdrawal of the amount sought to be withdrawn by Contractor.
7. The Owner shall have a right to draw upon the securities in the event of default by the Contractor. Upon seven (7) days' written notice to the Escrow Agent from the Owner of the notice of default under Article 2.2, Article 9.6 or Article 14, the Escrow Agent shall immediately convert the securities to cash and shall distribute the cash as instructed by the Owner.

8. Upon receipt of written notification from the Owner certifying that the Contract is final and complete, and that the Contractor has complied with all requirements and procedures applicable to the Contract, Escrow Agent shall release to Contractor all securities and interest on deposit less escrow fees and charges of the Escrow Account. The escrow shall be closed immediately upon disbursement of all moneys and securities on deposit and payment of fees and charges.

9. Escrow Agent shall rely on the written notifications from the Owner and the Contractor pursuant to Sections (5) to (8), inclusive, of this Agreement and the Owner and Contractor shall hold Escrow Agent harmless from Escrow Agent's release and disbursement of the securities and interest as set forth above.

10. The names of the persons who are authorized to give written notice or to receive written notice on behalf of the Owner and on behalf of Contractor in connection with the foregoing, and exemplars of their respective signatures are as follows:

On behalf of Owner:

Title

Name

Signature

Address

On behalf of Contractor:

Title

Name

Signature

Address

On behalf of Agent:

Title

Name

Signature

Address

At the time the Escrow Account is opened, the Owner and Contractor shall deliver to the Escrow Agent a fully executed counterpart of this Agreement.

IN WITNESS WHEREOF, the parties have executed this Agreement by their proper officers on the date set forth above.

OWNER

CONTRACTOR

Title

Title

Name

Name

Signature

Signature

INSURANCE DOCUMENTS & ENDORSEMENTS

The OCIP insurance endorsements and documents must be provided to the Antioch Unified School District within five (5) calendar days after receipt of notification of award. If the apparent low bidder fails to provide the documents required below, the District may award the Contract to the next lowest responsible and responsive bidder or release all bidders, and the bidder's bid security will be forfeited. All insurance provided by the bidder shall fully comply with the requirements set forth in Article 11 of the General Conditions.

**DISABLED VETERAN BUSINESS ENTERPRISE (DVBE) CONTRACTOR CLOSE-
OUT STATEMENT**

The Contractor shall complete this form, as a condition to Final Payment, for purposes of reporting participation by Disabled Veteran Business Enterprises (DVBE) in the Contract for the Project/Bid No. specified below.

Project Name: _____

Bid No.: _____

DSA No.: _____

| Name | Address/Phone | Category of Work* | \$ Amount of Contract |
|------|---------------|-------------------|-----------------------|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

* Categories of work include: (1) construction services (specify services that DVBE will provide); (2) architecture and engineering services; (3) procurement of materials, supplies and equipment; and (4) information technology.

The undersigned, on behalf of the Contractor, certifies that DVBE participation on the Contract for Bid No. _____ equaled _____ dollars (\$ _____), which represents approximately _____ percent (____%) of the total Contract price including change orders for the Project.

Company: _____

Name: _____

Title: _____

Signature: _____

Date: _____

CONTRACTOR CERTIFICATION REGARDING BACKGROUND CHECKS

(Modernization Projects)

_____ certifies that it has performed one of the following:
[Name of contractor/consultant]

- ☐ Pursuant to Education Code section 45125.1, Contractor has conducted criminal background checks, through the California Department of Justice, of all employees providing services to the Antioch Unified School District, pursuant to the Contract/Purchase Order dated _____, and Contractor hereby certifies that none of the employees have been convicted of, or have an arrest pending final adjudication for, any serious or violent felonies, as specified in Penal Code sections 1192.7(c) and 667.5(c), respectively.

As further required by Education Code section 45125.1, attached hereto as Attachment "A" is a list of the names of the employees of the undersigned who may come in contact with pupils.

OR

- ☐ Pursuant to Education Code section 45125.2, Contractor will ensure the safety of pupils by one or more of the following methods:
- ☐ 1. The installation of a physical barrier at the worksite to limit contact with pupils.
 - ☐ 2. Continual supervision and monitoring of all employees of the entity by an employee of the entity whom the Department of Justice has ascertained has not been convicted of a violent or serious felony.

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

Date _____, 20__

[Name of Contractor/Consultant]

By its: _____

ATTACHMENT A:

CONTRACTOR CERTIFICATION REGARDING BACKGROUND CHECKS

(INSERT NAMES OF EMPLOYEES WHO MAY COME IN CONTACT WITH PUPILS)

GENERAL CONDITIONS

ARTICLE 1 DEFINITIONS

1.1 BASIC DEFINITIONS

NOTE: The following shall not be construed as a comprehensive list of all definitions in the Contract Documents and there may be other definitions set forth in the Contract Documents. Additionally, any references to any DSA forms, documents or requirements shall be construed to incorporate any updates, supplements, or additions. The Contractor shall be required to meet the latest DSA requirements applicable to the Project.

1.1.1 Action of the Governing Board is a vote of a majority of the District's Governing Board.

1.1.2 Approval means written authorization through action of the Governing Board.

1.1.3 Architect means the architect, engineer, or other design professional engaged by the District to design and perform general observation of the work of construction and interpret the Drawings and Specifications for the Project. (See ARTICLE 4)

1.1.4 As-Builts are a set of Plans and Specifications maintained by the Contractor clearly showing all changes, revisions, substitutions, field changes, final locations, and other significant features of the Project. The As-Builts shall be maintained continuously throughout the Work for the Project and is both a prerequisite to the issuance of Payment Application and a requirement for Contract Close-Out. (See Article 3.17)

1.1.5 Beneficial Occupancy is the point in time when a building (or buildings) is fit for occupancy and its intended use. Basic requirements are that the building is safe, at or near Substantial Completion, and all fire/life safety items are approved and operational. The fact that a building is occupied does not mean that the building is ready for Beneficial Occupancy if there are elements that are unsafe or if fire/life safety items are not approved and operational. Taking occupancy on a structure that is under a fire watch is not considered beneficial occupancy. Further, taking of Beneficial Occupancy is not a point in time when retention is due unless the entire Project has obtained a Certificate of Substantial Completion that meets the definition of 1.1.46.

1.1.6 Claims. A Claim is a request for payment, supported by back-up documentation which includes, invoices time sheets, or other documents substantiating legitimacy or entitlement that is submitted during the Project or immediately following the Project made prior to the Final Retention Payment Application and prior to Final Completion of the Project. A "Claim" means a separate demand by the Contractor for (1) time extension, (2) payment of money or damages arising from Work done by or on behalf of the Contractor pursuant to the CONTRACT and payment of which is not otherwise expressly provided for or the claimant is not otherwise entitled to, or (3) and amount the payment of which is disputed by the District. (See Article 4.6)

1.1.7 Change Order (CO). A CO is a written instrument prepared by the Architect and signed by the District (as authorized by the District's Governing Board), the Contractor, and the Architect, stating their agreement upon (1) A description of a change in the Work, (2) The amount of the adjustment in the Contract Sum, if any; and (3) The extent of the adjustment in the Contract Time, if any. (See Article 7.2)

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1.1.8 Change Order Request (COR). A COR is a written request supported by backup documentation prepared by the Contractor requesting that the District and the Architect issue a CO based upon a proposed change, or a change that results in an adjustment in cost, time or both, or arising from an RFP, CCD or ICD. (See Article 7.6)

1.1.9 Close-Out means the process for Final Completion of the Project, but also includes the requirements for the DSA Certification that the Project is Complete (See DSA Certification Guide). (See Article 9.9)

1.1.10 Construction Change Document (CCD). A Construction Change Document is a DSA term that is utilized to address changes to the DSA approved Plans and Specifications. There are two types of Construction Change Documents. (1) DSA approved CCD Category A for work affecting structural, access or fire/ life safety of the Project which will require a DSA approval; and, (2) CCD Category B for work NOT affecting structural safety, access compliance or fire/ life safety that will not require a DSA approval (except to confirm that no approval is required). Both CCD Category A and Category B shall be set forth in DSA Form 140 and submitted to DSA as required. (See Article 7.3)

1.1.11 Complete/ Completion/ Final Completion means that all Work in the Contract Documents is finished, the requirements of the Contract Documents have been met, the Project has been Closed Out, and all Work has ceased on the Project. This may also be referred to as Final Completion. In most cases, the recording of a Notice of Completion shall represent Completion of the Project. Beneficial Occupancy does not mean the Work is Complete.

1.1.12 Completion Date is the date when all Work for the Project shall be Substantially Complete and is the date assigned at the end of the Contract Time for the Project. (See Article 1.1.46)

1.1.13 Construction Manager. The Construction Manager is a consultant to the District contracted to assist in Project planning, management and construction of the Project. If there is a Construction Manager, they may assist in various aspects of the Project including, but not limited to Monitoring the progress of the construction, reviewing and monitoring the schedule, progress of work, monitoring pay requests, facilitating communications, advising the District and its Board of Education on various aspects of the construction process, monitoring the RFI, COR, CCD, ICD, RFP, Claims, Disputes and other Project related processes.

1.1.14 Contract or Agreement when the terms are used in these General Conditions shall be references to the Contract Documents as defined herein.

1.1.15 Contract Documents (sometimes referred to as Construction Documents) consist of the Agreement between District and Contractor (hereinafter the Agreement or Contract), Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to bid, instructions to bidders, notice to bidders, and the requirements contained in the Bid Documents, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is a written amendment to the Contract signed by parties, a Change Order, a Construction Change Document, or a written order for a minor change in the Work issued by the Architect. The Contract Documents collectively form the Contract. The Contract represents the entire and integrated Agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a written Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind between the Architect and Contractor, between the District and any Subcontractor or Sub-subcontractor, or between any persons or

GENERAL CONDITIONS

entities other than the District and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

1.1.16 Contract Time is the time period specified in the Contract Documents in which the Project shall be completed. This is sometimes referred to a Contract Duration, or "time in which the Contractor has to complete the Project". (See Article 8.1.1)

1.1.17 Contractor, District, and Architect are those mentioned as such in the Agreement. They are treated throughout the Contract Documents as if they are of singular number and neuter gender. Any reference to "Owner" shall mean "District" or Antioch Unified School District.

1.1.18 Cure is the act of remedying a material failure to perform under the terms of the Contract Documents during the time provided to correct Contractor's Default. Specific time periods are provided to Cure and Correct a Contractor Default under Article 14 and for a Partial Default under Article 2.2 as well as elsewhere in the Contract Documents.

1.1.19 Days mean calendar days unless otherwise specifically stated.

1.1.20 Default is a material breach of Contract. A Termination for Cause under Article 14 is a declaration of Default of the Contract and shall act as a demand upon the Surety to perform under the terms of the Performance Bond. Partial Defaults may also be tendered to the Surety at District's discretion. (See Article 2.2)

1.1.21 Dispute. A dispute is a disagreement on terms or conditions of the Project where the Contractor's opinion of the Project, Payment, Change Order or Request for Proposal differs from that of the District or Architect. A dispute only rises to the level of a claim once the dispute is assembled with back-up documentation and presented for evaluation. (See Article 4.6)

1.1.22 District Representative is the person designated by the District to represent the District during the Construction for the Project. This District Representative shall have the delegated authority as further defined in Article 1.1.2. This District Representative may be an employee of the District who may have the delegated authority as set forth in Article 1.1.3, and may also include Construction Managers. In some cases, the District and its Board may be assisted by a Construction Manager. When a Construction Manager is assisting the District, the Contractor, Architect, and Inspector shall have a primary contact with the District's Construction Manager who will advise the District.

1.1.23 Drawings/Plans are graphic and pictorial portions of the Contract Documents prepared for the Project and approved changes thereto, wherever located and whenever issued, showing the design, location, and scope of the Work, generally including Plans, elevations, sections, details, schedules, and diagrams as drawn or approved by the Architect. Sometimes Drawings will also be included in Addenda, Change Orders, and Specifications.

1.1.24 DSA is the Division of State Architect. DSA is the agency that provides design and construction oversight for K-12 Schools, Community Colleges, and State Funded Charter School Projects. DSA is the responsible agency for this Project and Contractor has submitted a bid for the Project since Contractor is familiar with Contractor's responsibilities under the DSA requirements more thoroughly set forth at Title 24 of the California Code of Regulations. Contractor agrees to abide by the jurisdiction of DSA and shall construct the Project to conform with the approved Plans, Specifications, Addenda, and

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Change Orders (inclusive of approved CCD's and ICD's issued by the District pending CCD approval). See DSA website.

1.1.25 Emergency shall be defined as a sudden, unexpected occurrence, involving a clear and imminent threat to the continuation of school classes, a critical path delay that will result in not being able to occupy the school when students arrive to use the facility, danger from the facility or from outside the facility, Act of God, or other action which requires immediate action to prevent or mitigate loss of, or damage to, life, health, property, or essential public services.

1.1.26 Float the total number of days an activity may be extended or delayed without delaying the Completion Date shown in the schedule. Float will fall into three categories: (1) Rain Days; (2) Governmental Delays; and, (3) Project Float. (See Article 8.1.4)

1.1.27 Immediate Change Directive. (ICD) A written order prepared by the Architect and signed by the District and the Architect, directing a change in the Work where the Work must proceed immediately and stating a proposed basis for adjustment, if any, in the Contract Sum or Contract Time, or both. (See Article 7.3)

1.1.28 Inspector of Record (IOR)/ Project Inspector (PI) is the individual retained by the District in accordance with Title 24 of the California Code of Regulations and who will be assigned to the Project. The IOR must be approved by the A/E of record, DSA and structural engineer (when applicable).

1.1.29 Notice of Non-Compliance (DSA Form 154) is a document issued by the Inspector if there is a deviation from the DSA approved Plans, Specifications, and Change Orders. (See Article 7.1.2)

1.1.30 Payment Application or Certificate of Payment is the Contractor's certified representation of the actual level of Work performed on the Project. Payment Applications are sometimes also called "Certificate of Payment", "Request for Payment", "Payment Application", or similar terms, and shall follow the Schedule of Values that are approved by the Architect, Inspector and District. (See Article 9.3)

1.1.31 Project is the complete construction of the Work performed in accordance with the Contract Documents.

1.1.32 Project Manual is the volume assembled for the Work which may include, without limitation, the bidding requirements, sample forms, Conditions of the Contract, and Specifications.

1.1.33 Provide shall include "provide complete in place," that is "furnish and install complete."

1.1.34 Punch List/ Punch Item/ Incomplete Punch Item is a list of minor repair items, prepared after the issuance of a Certificate of Substantial Completion, by the Inspector and Architect of Work required in order to complete the Contract Documents and ensure compliance with the DSA Approved Plans so the Project may be Closed Out. Issuance of the Retention Payment is dependent of the proper completion of the Punch List. (See Article 9.9)

1.1.34.1 *Contractor's List of Punch Items* is a list of minor repair items the Contractor submits when the Contractor considers the Work Substantially Complete. Submission of this List of Incomplete Punch Items is the Contractor's representation that the Project is Substantially Complete. (See Article 9.9.1.1)

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1.1.35 Request for Information (RFI) is a written request prepared by the Contractor requesting the Architect to provide additional information necessary to clarify or amplify an item which the Contractor believes is not clearly shown or called for in the Drawings or Specifications, or to address problems which have arisen under field conditions. (See Article 7.4)

1.1.36 Request for Proposal (RFP) is a written request prepared by the Architect (and/or CM) requesting the Contractor to submit to an estimate of the effect of a proposed change on the Contract Price and (if applicable) the Contract Time. (See Article 7.5)

1.1.37 Safety Orders are those issued by any city, county, state or federal agency having jurisdiction over the Project.

1.1.38 Schedule is the Contractor's view of the practical way in which the Work will be accomplished. In this Agreement there is a requirement for a Baseline Schedule and regular Schedule Updates that show all Work to be completed during the Contract Time and shall include all items listed under Article 8.3.2.9. See Article 8 of the General Conditions.

1.1.39 Schedule of Values is a detailed breakdown of the Contract Price for each Project, building, Phase of Work or Site as determined by the District. This Schedule of Values shall adequately detail the price for the Work so Progress Payments Applications can be meaningfully reviewed by the Inspector, Architect of Record, Engineer of Record, and District. (See Article 9.2)

1.1.40 Separate Contracts are Contracts that the District may have with other Contractors, vendors, suppliers, or entities to perform Work on the Project. This may include, but is not limited to Multi-Prime Trade Contractors, furniture installers, testing agencies, clean-up contractors, or network or low voltage contractors. Contractor shall plan for certain other contractors that may also be working on the Project site and address these other contractors in Contractor's Schedule. (See Article 6)

1.1.41 Site refers to the grounds of the Project as defined in the Contract Documents and such adjacent lands as may be directly affected by the performance of the Work.

1.1.42 Specifications are that portion of the Contract Documents consisting of the written requirements for material, equipment, construction systems, instructions, quality assurance standards, workmanship, and performance of related services.

1.1.43 Standards, Rules, and Regulations referred to are recognized printed standards and shall be considered as one and a part of these Specifications within limits specified. Federal, state and local regulations are incorporated into the Contract Documents by reference.

1.1.44 Stop Work Order, or an Order to Comply, is issued when either (1) the Work proceeds without DSA approval; (2) the Work proceeds without a DSA Inspector of Record, or (3) where DSA determines that the Work is not being performed in accordance with applicable rules and regulations, and would compromise the structural integrity of the Project or would endanger lives. If a Stop Work Order is issued, the Work in the affected area shall cease until DSA withdraws the Stop Work Order. Pursuant to Education Code section 17307.5(b), the District shall not be held liable in any action filed against the District for any delays caused by compliance with the Stop Work Order

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1.1.45 Subcontractor, as used herein, includes those having direct or indirect contracts with Contractor and ones who furnished labor, material or services for a special design according to Plans, Drawings, and Specifications of this Work.

1.1.46 Substantial Completion/ Substantially Complete(d) is not reached unless and until each of the following four (4) conditions have been met: (1) all contractually required items have been installed with the exception of only minor and Incomplete Punch List Items (See Article 9.9.1.2); (2) All Fire/Life Safety Systems have been installed, and are working and signed off on the DSA Form 152 Inspection Card, and all building systems including mechanical, electrical and plumbing are all functioning; (3) all other items in the DSA Form 152 Inspection Card for the Project have been approved and signed off; and (4) the Project is fit for occupancy and its intended use. For the purposes of this Contract, any references to Completion Date means Substantial Completion Date.

1.1.47 Substitution is a change in product, material, equipment, or method of construction from those required by the Construction Documents proposed by the Contractor. For this Project, a Substitution is subject to the filing of a Construction Substitution Request Form at the time of bid and meeting the requirements of Article 3.10.

1.1.48 Supplementary Conditions/ Supplementary General Conditions/ Special Conditions are terms that are sometimes used interchangeably and refer to any additional requirements or changes to the General Conditions as noted.

1.1.49 Surety is the person, firm, or corporation that executes as a bid bond, Payment Bond or Performance Bond guarantor on the Contractor's Bid, Contractor's Performance on the Contract and Payment of the Contractor's Subcontractors, material suppliers, vendors and labor on the Project. The Surety is bound to the same extent as the Contractor is bound once a Default occurs. A default includes a Termination for Substantial Failure to Perform under Article 14, but also includes any breach of Contract and is subject to the requirements and responsibilities as set forth in the Performance Bond.

1.1.50 Work shall include all labor, materials, services and equipment necessary for the Contractor to fulfill all of its obligations pursuant to the Contract Documents. It shall include the initial obligation of any Contractor or Subcontractor who performs any portion of the Work, to visit the Site of the proposed Work (a continuing obligation after the commencement of the Work), to fully acquaint and familiarize itself with the conditions as they exist and the character of the operations to be carried out under the Contract Documents, and make such investigation as it may see fit so that it shall fully understand the facilities, physical conditions, and restrictions attending the Work under the Contract Documents. Each such Contractor and its Subcontractors shall also thoroughly examine and become familiar with the Drawings, Specifications, and associated Contract Documents and bid documents before preparing and submitting any bid.

1.1.51 Workers include laborers, workers, and mechanics.

1.2 EXECUTION, CORRELATION AND INTENT

1.2.1 Correlation and Intent

1.2.1.1 *Documents Complementary and Inclusive.* The Contract Documents are complementary and are intended to include all items required for the proper execution and completion of the Work. All Contract Documents form the Contractor's Contract with the District. Any item of Work

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mentioned in the Specifications and not shown on the Drawings, or shown on the Drawings and not mentioned in the Specifications, shall be provided by Contractor as if shown or mentioned in both. The Contractor is bound to provide the Work complete and is under a legal duty to carefully study Plans and schedule operations well ahead of time and identify inconsistencies with the Plans and Specifications and call such inconsistencies to the attention of the Architect or Registered Engineer through the Inspector under Section 4-343(b) of Title 24.

1.2.1.2 *Work to be Complete.* Contractor has thoroughly studied the Contract Documents and understands that the District contracted with Contractor to provide a complete Project which means complete systems and buildings. The entire set of Contract Documents shows a complete Project and Contractor agrees that there are multiple disciplines putting together a set of Contract Documents. Thus, if portions of a system are shown on some Drawings and not others, this does not mean the Contractor is to only provide part of a system. For example, if an air conditioning unit is shown on the mechanical Drawings, the plumbing for the air conditioning is shown on another Drawing, and the electrical shown on the electrical Drawings, the Contractor is to provide a complete and working air conditioning system. The only time when an item is supplied incomplete is if the system is shown specifically as incomplete since others will be completing the system. Work includes, but is not limited to materials, workmanship, and manufacture of fabrication of components for the Project.

1.2.1.3 *Coverage of the Drawings and Specifications.* The Drawings and Specifications generally describe the Work to be performed by Contractor. Generally, the Specifications describe Work which cannot be readily indicated on the Drawings and indicate types, qualities, and methods of installation of the various materials and equipment required for the Work. It is not intended to mention every item of Work in the Specifications, which can be adequately shown on the Drawings, or to show on the Drawings all items of Work described or required by the Specifications even if they are of such nature that they could have been shown. All materials or labor for Work, which is shown on either the Drawings or the Specifications (or is reasonably inferable therefrom as being necessary to complete the Work), shall be provided by the Contractor. The Contractor is responsible for the whole Project as contractually set forth as the Contract Documents. It is intended that the Work be of sound, quality construction, and the Contractor shall be responsible for the inclusion of adequate amounts to cover installation of all items indicated, described, or implied in the portion of the Work to be performed by them.

1.2.1.4 *Conflicts.* In the event there is a discrepancy between the various Contract Documents, it is intended that the more stringent, higher quality, and greater quantity of Work shall apply.

1.2.1.5 *Conformance with Laws.* Each and every provision of law required by law to be inserted in this Contract shall be deemed to be inserted herein, and the Contract shall be read and enforced as though it were included herein, even if through mistake or otherwise any such provision is not inserted, or is not correctly inserted. Contractor, all Subcontractors and any and all workers performing Work on this Project shall fully comply with all laws, ordinances, codes, rules and regulations of all governmental authorities and public and municipal utilities affecting the construction and operation of the physical plant of the Project, all quasi-governmental and other regulations affecting the construction and operation of the physical plant of the Project, and other special requirements, if any, designated in the Contract Documents including, but not limited to, any existing and future order, regulations, guidelines or other requirements issued by any federal, state or local authority applicable to the Project. All workers shall comply with current recommendations and requirements related to COVID-19. All workers must fully comply with any current and future orders and recommendations issued by the County where the District is located including, but not limited to, the County Public Health Department, as well as other applicable guidelines and

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recommendations issued by OSHA and CDC. If there are any inconsistencies or conflicts with any guidelines or recommendations, the stricter and more stringent provisions shall apply and prevail.

Before commencing any portion of the Work, Contractor shall check and review the Drawings and Specifications for such portion for conformance and compliance with all laws, ordinances, codes, rules and regulations of all governmental authorities and public and municipal utilities affecting the construction and operation of the physical plant of the Project, all quasi-governmental and other regulations affecting the construction and operation of the physical plant of the Project, and other special requirements, if any, designated in the Contract Documents. Such checking shall include review of Title 24 of the California Code of Regulations, California Building Code, local utility, local water connection, local grading and all other applicable agencies. In the event Contractor observes any violation of any law, ordinance, code, rule or regulation, or inconsistency with the Contract Documents, Contractor shall, within five (5) days, notify the Inspector, Architect and District in writing of same and shall ensure that any such violation or inconsistency shall be corrected in the manner provided hereunder prior to the construction of that portion of the Project. (See Title 24 Section 4-343)

The Contractor shall bear all expenses of correcting Work done contrary to said laws, ordinances, rules, and regulations if the Contractor performed same (1) without first consulting the Architect for further instructions regarding said Work or (2) disregarded the Architect's instructions regarding said Work.

1.2.1.6 *Ambiguity and Inconsistency.* Before commencing any portion of the Work, Contractor shall carefully examine all Drawings and Specifications and other information given to Contractor as to materials and methods of construction and other Project requirements. Prior to commencing any portion of the Work, Contractor shall notify Architect and District in writing of any perceived or alleged error, inconsistency, conflict, ambiguity, or lack of detail or explanation in the Drawings and Specifications in the manner provided herein. If the Contractor or its Subcontractors, material or equipment suppliers, or any of their officers, agents, and employees performs, permits, or causes the performance of any Work under the Contract Documents, which it knows or should have known to be in error, inconsistent, or ambiguous, or not sufficiently detailed or explained, Contractor shall bear any and all costs arising therefrom including, without limitation, the cost of correction thereof without increase or adjustment to the Contract Price or the time for performance. Contractor shall maintain an adequate inspection system and perform personal observations and review work and pre-plan the project to ensure the Work performed under the Contract conforms to Contract requirements. Contractor shall maintain records of such review and observation to ensure strict compliance with the terms of the Contract.

1.2.1.7 *Typical Parts and Sections.* Whenever typical parts or sections of the Work are completely detailed on the Drawings, and other parts or sections which are of the same construction are shown in outline only, the complete or more detailed shall apply to the Work which is shown in outline.

1.2.1.8 *Dimensions.* Dimensions of Work shall not be determined by scale or rule. Figured dimensions shall be followed at all times. If figured dimensions are lacking on Drawings, Architect shall supply them on request. The Architect's decisions on matters relating to aesthetic effect will be final.

1.2.2 Addenda and Deferred Approvals

1.2.2.1 *Addenda* are the changes in Specifications, Drawings, Contract Documents, and Plans which have been authorized in writing by the District or Architect, and which alter, explain, or

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clarify the Contract Documents. Addenda shall govern over all other Contract Documents. Subsequent addenda issued shall govern over prior addenda unless otherwise specified in the addenda.

1.2.2.2 *Deferred Approvals.* Deferred Approvals are Submittals that are reviewed by the Architect (or Engineer of Record) and submitted to DSA for approval based on thorough detailing of manufacturer and Project specific design. See Article 3.9.1 and 3.9.3. The Deferred Approval item cannot be fully detailed on the originally approved Drawings or Specifications because of variations in product design and manufacture. Contract Documents which require Deferred Approval items are meant to be for illustration purposes only. Approval of Plans for such a portion of the Work may be deferred until the material suppliers and Subcontractors are selected. All Deferred Approvals are noted in the Plans and Specifications. Contractor is responsible for all Deferred Approval requirements set forth in the Contract Documents. Contractor is responsible to comply with all laws, building codes, Title 24 and regulations necessary to obtain all necessary approvals, including those required from the Division of the State Architect (“DSA”) and the State Fire Marshall. Contractor shall not be granted an extension of time for failure to plan, schedule for and obtain necessary approvals. Contractor shall Schedule all Deferred Approval items in the Baseline Schedule and Schedule Updates under Article 3.9.6

1.2.3 Specification Interpretation

1.2.3.1 *Titles.* The Specifications are separated into titled sections for convenience only and not to dictate or determine the trade or craft involved.

1.2.3.2 *As Shown, Etc.* Where “as shown,” “as indicated,” “as detailed,” or words of similar import are used, reference is made to the Drawings accompanying the Specifications unless otherwise stated. Where “as directed,” “as required,” “as permitted,” “as authorized,” “as accepted,” “as selected,” or words of similar import are used, the direction, requirement, permission, authorization, approval, acceptance, or selection by Architect is intended unless otherwise stated.

1.2.3.3 *General Conditions.* The General Conditions and Supplementary General Conditions are a part of the Contract Documents which further defines and refines the Contract entered between the Contractor and District.

1.2.3.4 *Abbreviations.* In the interest of brevity, the Specifications are written in an abbreviated form and may not include complete sentences. Omission of words or phrases such as “Contractor shall,” “shall be,” etc., are intentional. Nevertheless, the requirements of the Specifications are mandatory. Omitted words or phrases shall be supplied by inference in the same manner as they are when a “note” occurs on the Drawings. In the interest of brevity, the Contract Documents frequently omit modifying words such as “all” and “any” and articles such as “the” and “an,” but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

1.2.3.5 *Plural.* Words in the singular shall include the plural whenever applicable or the context so indicates.

1.2.3.6 *Metric.* The Specifications may indicate metric units of measurement as a supplement to U.S. customary units. When indicated thus: 1” (25 mm), the U. S. customary unit is specific, and the metric unit is nonspecific. When not shown with parentheses, the unit is specific. The metric units correspond to the “International System of Units” (SI) and generally follow ASTM E 380, “Standard for Metric Practice.”

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1.2.3.7 *Standard Specifications.* Any reference to standard specifications of any society, institute, association, or governmental authority is a reference to the organization's standard specifications, which are in effect at the date of the Contractor's proposal unless directed otherwise. If applicable specifications are revised prior to completion of any part of the Work, the Contractor may, if acceptable to Architect, perform such Work in accordance with the revised specifications. The standard specifications, except as modified in the Specifications for the Project, shall have full force and effect as though printed in the Specifications. Architect will furnish, upon request, information as to how copies of the standard specifications referred to may be obtained.

1.2.4 Rules of Document Interpretation

1.2.4.1 In the event of conflict within the Drawings, the following rules shall apply:

- a. General Notes, when identified as such, shall be incorporated into other portions of Drawings.
- b. Schedules, when identified as such, are complementary with other notes and other portions of Drawings including those identified as General Notes.
- c. Larger scale Drawings shall take precedence over smaller scale Drawings.
- d. At no time shall the Contractor base construction on scaled Drawings.

1.2.4.2 Specifications shall govern as to materials, workmanship, and installation procedures.

1.2.4.3 If Contractor observes that Drawings and Specifications are in conflict, Contractor shall, prior to commencing work, notify the Architect in writing for the purposes of obtaining an interpretation of the Contract Documents.

1.2.4.4 In the case of conflict or inconsistencies, the order of precedence shall be as follows:

- a. General Conditions take precedence over Drawings and Specifications.
- b. Supplemental Conditions take precedence over General Conditions.
- c. The Agreement Form shall take precedence over the Supplemental Conditions.
- d. In the case of disagreement or conflict between or within Specifications, and Drawings, the more stringent, higher quality, and greater quantity of Work shall apply.
- e. Addenda shall take precedence over Drawings and Specifications.
- f. General Conditions shall take precedence over Addenda.
- g. Drawings and Specifications take precedence over the Soils Report.

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1.3 OWNERSHIP AND USE OF ARCHITECT'S DRAWINGS, SPECIFICATIONS AND OTHER DOCUMENTS

The Drawings, Specifications, and other Contract Documents for the Project are the property of the District and/or Architect pursuant Contract requirements between the District and Architect. The Contractor may retain one Contract record set. Neither the Contractor nor any Subcontractor, or material or equipment supplier shall own or claim a Copyright in the Drawings, Specifications, and other documents prepared by the Architect. All copies except the Contractor's record set, shall be returned or properly accounted for upon completion of the Work. The Drawings, Specifications, and other documents prepared by the Architect, and copies thereof furnished to the Contractor are not to be used by the Contractor or any Subcontractor, Sub-subcontractor, or material or equipment supplier on other projects or for additions to this Project outside the scope of the Work. The District and/or Architect hereby grants the Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers a limited license to use applicable portions of the Drawings, Specifications, and other documents prepared for the Project in the execution of their Work under the Contract Documents. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the District's property interest or other reserved right.

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ARTICLE 2 DISTRICT

2.1 INFORMATION AND SERVICES REQUIRED OF THE DISTRICT

2.1.1 Site Survey

The District will furnish, at its expense, a legal description of the Site and a land survey showing the boundaries of the Site. Contractor shall be responsible for all surveys regarding location of construction, grading and site work.

2.1.2 Soils

When required by the scope of the Project, the District will furnish, at its expense, the services of geotechnical engineers or consultants when reasonably required and deemed necessary by the Architect or as required by local or state codes. Such services, with written reports and appropriate written professional recommendations, may include test boring, test pits, soil bearing values, percolation tests, air and water pollution tests, and ground corrosion and resistivity tests, including necessary operations for determining subsoil, air, and water conditions.

2.1.3 Soils Report Part of the Contract Documents: Contractor Reliance

A soils investigation report has been obtained from test holes at the Site, and such report is incorporated into this Contract and made available for the Contractor's use in preparing its bid and Work under this Contract. Where the Plans and Specifications are more specific and provide more significant structure, systems, reinforcing, thicknesses, or construction methods, the Drawings shall control over the soils report. The soils report is available at the Architect's office for review and it is Contractor's responsibility to ensure that Contractor has reviewed the soils investigation report. Any information obtained from such report or any other information given on Drawings as to subsurface soil condition or to elevations of existing grades or elevations of underlying rock is approximate only. If, during the course of Work under this Contract, Contractor encounters subsurface conditions which differ materially from those indicated in the soils report, then Contractor shall notify the District within five (5) calendar days of discovery of the condition, and changes to the Contract Price may be made in accordance with Article 7 entitled "Changes in the Work." Contractor agrees that no claim against District will be made by Contractor for damages and hereby waives any rights to damages in the event the Contractor fails to notify District within the five-day period mentioned above.

WARNING: DISTRICT DOES NOT WARRANT THE SOILS AT THE PROJECT SITE. CONTRACTOR HAS REVIEWED AND IS FAMILIAR WITH THE REQUIREMENTS OF THE SOILS INVESTIGATION REPORT. CONTRACTOR UNDERSTANDS THAT PLANS, DRAWINGS AND SPECIFICATIONS SUPERSEDE THE SOILS REPORT IF THERE ARE CONFLICTS. FURTHER, IN ADDITION TO THE INFORMATION IN THE SOILS REPORT, CONTRACTOR HAS CONDUCTED AN INDEPENDENT INVESTIGATION OF THE PROJECT SITE AND THE SOILS CONDITIONS OF THE SITE. DISTRICT DOES NOT WARRANT THE SOILS CONDITIONS OF THE SITE AND CONTRACTOR IS FULLY RESPONSIBLE TO ASCERTAIN SITE CONDITIONS

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FOR THE PURPOSES OF DETERMINING CONSTRUCTION MEANS AND METHODS PRIOR TO COMMENCING CONSTRUCTION.

2.1.4 Utilities

2.1.4.1 *Location of Point of Connection.* The locations shown for the point of connection are approximate. It shall be the responsibility of the Contractor to determine the exact location of all service connections.

2.1.4.2 *Regional Notification Center.* Contractor, except in an emergency, shall contact the appropriate regional notification center at least two (2) business days prior to commencing any excavation if the excavation will be conducted in an area or in a private easement which is known, or reasonably should be known, to contain subsurface installations other than the underground facilities owned or operated by the District, and obtain an inquiry identification number from that notification center. See Government Code section 4216.3. No excavation shall be commenced and carried out by the Contractor unless such an inquiry identification number has been assigned to the Contractor or any Subcontractor of the Contractor and the District has been given the identification number by the Contractor. Any damages arising from failure to make appropriate regional notification shall be at the sole risk of Contractor. Contractor shall solely be responsible for any fines, penalties or damages for violation of this Article and Government Code section 4216.6 or 4216.7. Any delays caused by failure to make appropriate regional notification shall be at the sole risk of Contractor and shall not be considered for extension of time pursuant to Article 8.4.

2.1.4.3 *Utilities - Removal and Restoration.* The District has endeavored to determine the existence of utilities at the Site of the Work from the records of the District of known utilities in the vicinity of the Work. The positions of these utilities as derived from such records are shown in the Contract Documents. Thus, the locations of the main or trunklines located on the Drawings are approximate locations and not exact.

No excavations were made to verify the locations shown for underground utilities. Other than the main or trunkline, which the District has endeavored to locate on the Plans, service connections or laterals to these utilities may not be 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 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's representative as to any utility main or trunkline discovered by Contractor in a different position than provided by the Regional Notification Center. With respect to main or trunklines, Contractor is to immediately notify District if the location is substantially different than as shown in the Contract Documents.

Contractor shall coordinate its Work with all utilities, including, but not limited to electricity, water, gas and telephone and meet with said utilities prior to the start of any work. Contractor shall show timing of all utility coordination activities under the Scheduling requirements of Article 8.

2.1.4.4 *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:

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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 of the service connection, 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.

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.

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 Article 7 or will make changes in the alignment and grade of the Work to obviate the necessity to remove, relocate, or temporarily maintain the utility. Changes in alignment and grade will be ordered in accordance with Article 7 herein.

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 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.

2.1.5 Existing Utility Lines; Removal, Relocation

2.1.5.1 *Main or Trunkline Facilities.* If the Contractor while performing the Contract discovers utility facilities not identified in the Contract Documents, Contractor shall notify the District and utility in writing prior to commencing work.

The owner of the public utility shall have the sole discretion to perform repairs or relocation work or permit the Contractor to do such repairs or relocation work at a reasonable price.

The Contractor shall exercise reasonable care and shall be compensated by the District for the actual verified field costs of locating, and removing, relocating, protecting or temporarily maintaining such main or trunkline utility facilities located in a substantially different location than in the Plans and Specifications, and for equipment in use on the project necessarily idled during such work. This Work shall be performed in accordance with Article 7 of these General Conditions.

2.1.5.2 *Assessment.* Nothing in these subparagraphs shall be deemed to require the District to indicate the presence of existing service laterals or appurtenances whenever the presence of such

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utilities on the Site can be inferred from the presence of other visible facilities, such as buildings, or meter junction boxes on or adjacent to the Site and could be inferred from the Main or Trunkline shown on the Drawings.

2.1.5.3 *Notification.* If the Contractor, while performing Work under this Contract, discovers utility facilities not identified by the District in the Contract Documents. Contractor shall, within five (5) days, notify the District and the utility in writing. If Contractor fails to notify the District within forty eight hours after discovery of any utility facilities not identified by District in the Contract Documents, Contractor waives all rights to be compensated for any extra Work or damages resulting from such discovered utilities.

2.1.6 Easements

District shall secure and pay for easements for permanent structures or permanent changes in existing facilities, if any, unless otherwise specified in the Contract Documents.

2.2 DISTRICT'S RIGHT TO CARRY OUT THE WORK DUE TO PARTIAL DEFAULT IN A SPECIFIC SEGREGATED AREA OF WORK (48 HOUR NOTICE TO CURE AND CORRECT)

If the Contractor Defaults or neglects to carry out the Work in accordance with the Contract Documents, the District may provide forty-eight (48) hour written notice to cure (a shorter period of time in the case of Emergency or a critical path delay as defined in Article 2.2.1) Contractor's Partial Default in a specific segregated area of work. The District's right to issue a Partial Default of the Contractor's Work and take over that segregated area of Work includes, but is not limited to:

1. Failure to supply adequate workers on the entire Project or any part thereof;
2. Failure to supply a sufficient quantity of materials;
3. Failure to perform any provision of this Contract;
4. Failure to comply with safety requirements, or due to Contractor is creation of an unsafe condition;
5. Cases of bona fide emergency;
6. Failure to order materials in a timely manner;
7. Failure to prepare Deferred Approval items or Shop Drawings in a timely manner;
8. Failure to comply with Contractor's Baseline or Update Schedule, meet critical Milestones which would result in a delay to the critical path, or delay the Contract Time;
9. Failure to comply with the Subletting and Subcontracting Fair Practices, Public Contract Code section 4100, et seq.
10. Failure to meet the requirements of the Americans with Disabilities Act;
11. Failure to complete Punch List work;

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12. Failure to proceed on an Immediate Change Directive
13. Failure to correct a Notice of Deviation

If during the forty eight (48) hour period, the Contractor fails to Cure and correct the deficiency noted in the 48 hour notice of Partial Default with diligence and promptness, the District may correct such deficiencies without prejudice to other remedies the District may have, including a Termination for Cause as set forth in Article 14. If there are inadequate funds remaining the Project balance or in the Retention Escrow to address at least 150% of the costs set forth in the Article 2.2 notice, the District may copy the Surety on the written notice of Partial Default. If a notice to the Surety is provided, except in the cases of emergency or critical path delay, the Surety has the option to take over and complete the Work described in the written notice if Surety personally delivers notice to District that it intends to perform such work. In the case where written notice has been provided, the District shall allow Surety seven (7) days to perform the Work.

2.2.1 Service of Notice of Partial Default with Right to Cure

A written notice of Partial Default and right to cure under Article 2.2 (“Article 2.2 Notice” or “Notice of Partial Default”) shall be served by e-mail (with a copy provided by regular mail) to the e-mail address provided on the Bid submitted and copied to the Project Superintendent.

2.2.2 Shortened Time for Partial Default in the Case of Emergencies.

In an Emergency situation, the District may correct any of the deficiencies described in Article 2.2 without prejudice to other remedies by providing service of written notice of Emergency requiring a shortened time for Partial Default specifying the time given to cure, if any.

2.2.3 Shortened Time for Partial Default in the Case of Critical Path Delay

In the case of critical path delay, the District may correct any of the deficiencies described in Article 2.2 without prejudice to other remedies providing service of written notice of critical path delay to the Contractor with a specific description of the critical path delay items noting the line item or area of Work that is on the critical path and prescribe the length of shortened time to cure, if any.

2.2.4 Written Notice of Partial Default to be Deducted by Deductive Change Order

The District shall have the right to determine the reasonable value of the Article 2.2 Partial Default Work, or if there is an actual value for the Work, shall use that value and issue a Deductive Change Orders under Article 7.7.4

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ARTICLE 3 THE CONTRACTOR

3.1 SUPERVISION AND CONSTRUCTION PROCEDURES

3.1.1 Contractor

The Contractor shall continually supervise and direct the Work using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences, procedures; and shall coordinate all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. The Contractor shall not perform the Work without utilizing the Contract Documents or, where required, approved Submittals, Shop Drawings, or samples for any such portion of the Work. If any of the Work is performed by contractors retained directly by the District, Contractor shall be responsible for the coordination and sequencing of the work of those other contractors so as to avoid any impact on the Project Schedule pursuant to the requirements of Article 6 and Article 8. Specific duties of the Contractor shall include those set out in Section 43 of Title 21 of the California Code of Regulations and Section 4-343 of Title 24 of the California Code of Regulations. These duties include, but are not limited to the following:

3.1.1.1 *Responsibilities.* It is the duty of the Contractor to complete the Work covered by his or her Contract in accordance with the approved Plans and Specifications. The Contractor in no way is relieved of any responsibility by the activities of the Architect, Engineer, Inspector or DSA in the performance of their duties.

3.1.1.2 *Performance of the Work.* The Contractor shall carefully study the approved Plans and Specifications and shall plan its schedule of operations well ahead of time. If at any time it is discovered that work is being done which is not in accordance with the approved Plans and Specifications, the Contractor shall correct the Work immediately.

3.1.2 Contractor Responsibility to Study the Plans and Specifications

All inconsistencies or timing or sequences which appear to be in error in the Plans and Specifications shall promptly be called to the attention of the Architect or, Engineer, for interpretation or correction. Local conditions which may affect the structure shall be brought to the Architect's attention at once. In no case, shall the instruction of the Architect be construed to cause work to be done which is not in conformity with the approved Plans, Specifications, change orders, construction change documents, and as required by law. (See Title 24, Section 4-343)

3.1.3 All Work Under the Direction of Inspector

Pursuant to Title 24 requirements, the Contractor shall not carry on Work except with the knowledge of the Inspector. (See Title 24 generally)

3.1.4 Contractor to Establish Timing and Protocol with Inspector

Contractor shall establish a protocol for requesting inspection with Inspector so as to not delay the Work and provide adequate time for the Inspector to perform inspection. If such a protocol is not established ahead of time, Inspector may utilize the time criteria set by Title 24 of 48 hours in advance of

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submitting form DSA 156 for each new area. DSA requirements under PR 13-01 specifically gives the Special Inspector fourteen (14) days to post to the DSA website. Contractor is responsible for delays and for failure to plan.

For some Projects, there may be a need to incrementally install certain assemblies. It is up to Contractor to identify areas and assemblies that may be constructed incrementally. Contractor must identify and establish incremental areas of construction and establish protocols with Inspector for DSA 152 approvals so they may be presented to DSA. (See PR-13 item 1.17 for further discussion)

3.1.5 Verified Reports

The Contractor shall make and submit to the office from time to time, verified reports as required in Title 24 Section 4-366. As part of the Close-Out of the Project (see Article 9.9), Contractor shall be required to execute a Form 6-C as required under Title 24 Sections 4-343.

Contractor shall fully comply with any and all reporting requirements of Education Code sections 17315, et seq., in the manner prescribed by Title 24, as applicable.

3.1.6 Contractor Responsibility

The Contractor shall be responsible to the District for acts and omissions of the Contractor's employees, Subcontractors, material and equipment suppliers, and their agents, employees, invitees, and other persons performing portions of the Work under direct or indirect contract with the Contractor or any of its Subcontractors.

3.1.7 Obligations not Changed by Architect's Actions

The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract or by tests, inspections, or approvals required or performed by persons other than the Contractor.

3.1.8 Acceptance/Approval of Work

The Contractor shall be responsible to determine when any completed portions of the Work already performed under this Contract or provided pursuant to Article 6 are suitable to receive subsequent Work thereon.

3.2 SUPERVISION

3.2.1 Full Time Supervision

Unless personally present on the Project site where the Work is being performed, the Contractor shall keep on the Work at all times during its progress a competent, English speaking construction Superintendent satisfactory to the District. The Superintendent shall be present on a full-time basis, shall be dedicated exclusively to the Project and shall not share superintendency duties with another project or job. The Superintendent shall not be replaced except with written consent of the District. The Superintendent shall represent the Contractor in its absence and shall be fully authorized to receive and fulfill any instruction from the Architect, the Inspector, the District or any other District Representative

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(including CM in the cases where the District has a CM representative). All Requests for Information shall be originated by the Superintendent and responses thereto shall be given to the Superintendent. No Work shall begin on any day by any Subcontractor or other person on the Project site until the Superintendent has arrived, or shall any Work continue during the day after the Superintendent has departed from the Project site. The Superintendent shall have authority to bind Contractor through the Superintendent's acts. The Superintendent shall represent the Contractor, and communications given to the Superintendent shall be binding on the Contractor. Before commencing the Work, Contractor shall give written notice to District (and CM representative) and Architect of the name and a Statement of Qualifications of such superintendent. Superintendent shall not be changed except with written consent of District, unless a superintendent proves to be unsatisfactory to Contractor and ceases to be in its employ, in which case, Contractor shall notify District and Architect in writing. Contractor shall provide a replacement superintendent approved by the District prior to performing additional work.

3.2.2 Staff

Notwithstanding other requirements of the Contract Documents, the Contractor and each Subcontractor shall: (1) furnish a competent and adequate staff as necessary for the proper administration, coordination, supervision, and superintendence of its portion of the Work; (2) organize the procurement of all materials and equipment so that the materials and equipment will be available at the time they are needed for the Work; and (3) keep an adequate force of skilled and fit workers on the job to complete the Work in accordance with all requirements of the Contract Documents.

3.2.3 Right to Remove

District shall have the right, but not the obligation, to require the removal from the Project of any superintendent, staff member, agent, or employee of any Contractor, Subcontractor, material or equipment supplier.

3.3 LABOR AND MATERIALS

3.3.1 Contractor to Provide

Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, material, equipment, tools, construction equipment and machinery, water, heat, air conditioning, utilities, transportation, and other facilities, services and permits necessary for proper execution and completion of the Work whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

3.3.2 Quality

Unless otherwise specified, all materials and equipment to be permanently installed in the Project shall be new and shall be of the highest quality or as specifically stated in the Contract Documents. The Contractor shall, if requested, furnish satisfactory evidence as to kind and quality of all materials and equipment within ten (10) days of a written request by the District, including furnishing the District with bona fide copies of invoices for materials or services provided on the Project. All labor shall be performed by workers skilled in their respective trades, and shall be of the same or higher quality as with the standards of other school construction.

3.3.3 Replacement

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Any work, materials, or equipment, which do not conform to these requirements or the standards set forth in the Contract Documents, may be disapproved by the District, in which case, they shall be removed and replaced by the Contractor at no additional cost or extension of time to the District.

3.3.4 Discipline

The Contractor shall enforce strict discipline and good order among the Contractor's and Subcontractor's employees, and other persons carrying out the Contract. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them. As used in this subsection, "unfit" includes any person who the District concludes is improperly skilled for the task assigned to that person, who fails to comply with the requirements of this article, or who creates safety hazards which jeopardize other persons and/or property.

3.3.5 Fingerprinting (Applicable at the time Project is Occupied and on all Projects where Workers will come in Contact with Pupils, such as Modernization Projects)

If applicable, Contractor shall comply with the applicable provisions of Education Code section 45125.1 in a method as determined by the District. Pursuant to Education Code section 45125.1, Contractor shall either conduct criminal background checks of all employees of Contractor assigned to the Project site, and shall certify that no employees who have been convicted of or who have an arrest pending final adjudication for any serious or violent felonies, as specified in Education Code section 45125.1, will have contact with pupils, by utilizing the Contractor Certification Regarding Background Checks and the corresponding Attachment "A" as found in the Contract Documents or shall be separated by a physical barrier from students.

If it is determined that Contractor must provide certification of employees, as part of such certification, Contractor must provide the District with a list of all employees providing services pursuant to this Agreement, and designate which sites such employees will be assigned. In performing the services set forth in this Agreement, Contractor shall not utilize any employees who are not included on the above-referenced list.

Contractor's failure to comply with this law shall be considered a material breach of this Agreement upon where this Agreement may be terminated, at District's sole discretion, without any further compensation to Contractor.

In the case of new construction Projects where there are no students, if the Project Schedule provides for Beneficial Occupancy or portions of the Project or if the Project should be delayed, then Contractor, at no additional costs, shall meet the requirements of either fingerprinting or providing a physical barrier as required by the District.

3.3.6 Noise, Drugs, Tobacco, and Alcohol

Contractor shall take all steps necessary to insure that employees of Contractor or any of its Subcontractors' employees do not use, consume, or work under the influence of any alcohol, tobacco or illegal drugs while on the Project. Contractor shall further prevent any of its employees or its Subcontractor employees from playing any recorded music devices or radios or wearing any radio headphone devices for entertainment while working on the Project. Likewise, Contractor shall prevent its employees or Subcontractor's employees from bringing any animal onto the Project. Contractors shall not violate any written school policies.

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3.3.7 Delivery of Material

Contractor shall place orders for materials or equipment so that the Work may be completed in accordance with the Construction schedule for the Work as set forth in Article 8 of this Agreement. Contractor shall, upon demand from the Architect, furnish to the Architect documentary evidence including, but not limited to purchase orders, invoices, bills of materials, work orders and bills of lading, showing that orders have been placed. Contractor shall have a system to receive materials and to ensure that the proper materials are being delivered, including in the case of critical materials to the Project, checking the delivery against Shop Drawings and ensuring that the materials meet the requirements of not only the Plans and Specifications, but also the approved Shop Drawings and Submittals and in conformance with Contractor's plan for delivery of materials (including but not limited to Contractor's representations in the Schedules for the Project and Contractor's equipment and materials schedule under Article 3.7.2.2). Contractor shall be responsible for all costs of accepting non-conforming materials delivered to the Project given Contractor's responsibilities and system for acceptance of deliveries. Contractor shall notify Inspector and District Representative (including CM) as early as possible, in writing, of the delivery of materials for the Project. The deliveries shall include documentation identifying the shipment sufficiently so that the Inspector, Architect or District Representative (including CM) may review the materials that are received. Under no circumstances shall materials be delivered to the Project site that are meant for another Project.

3.3.8 Liens and Other Security Interests of Subcontractors and Material Suppliers

No material, supplies, or equipment for the Work shall be purchased subject to any chattel mortgage or under a conditional sale or other agreement by which an interest therein or in any part thereof is retained by seller or supplier. Contractor warrants good title to all material, supplies, and equipment installed or incorporated in Work and agrees upon completion of all Work to deliver premises, together with all improvements and appurtenances constructed or placed thereon by it, to District free from any claims, security interests, liens, or charges. Contractor further agrees that neither it nor any person, firm, or corporation furnishing any materials or labor for any Work covered by this Contract shall have any right to place a lien upon the premises or any improvement or appurtenance thereof, except that Contractor may install metering devices or other equipment of a utility company or political subdivision, title to which is commonly retained by the utility company or political subdivision. In event of installation of any such metering device or equipment, Contractor shall advise District as to its owner within five (5) days of such installation in writing, prior to making the installation.

Contractor agrees to indemnify, defend and hold the District harmless from any liens, stop notices, or assertion of security interests, including judgments and levies. If after written notice Contractor fails to address the lien, stop notice, or other security interest, the District may proceed to address the lien, stop notice or claim and seek reimbursement from Contractor.

3.3.9 Title to Materials

The title to new materials or equipment for the Work of this Contract shall remain with Contractor until incorporated in the Work of this Contract until final acceptance of the Project; no part of said materials shall be removed from its place of storage, and Contractor shall keep an accurate inventory of all said materials and equipment in a manner satisfactory to the District or its authorized representative. Responsibility for materials remains with Contractor and Contractor shall replace materials in case of loss. District similarly may pay for materials stored off site, but Contractor shall remain responsible for the materials that are stored off site.

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3.3.10 Assemblies

For all material and equipment specified or indicated in the Drawings, the Contractor shall provide all labor, materials, equipment, and services necessary, (including engineering as specifically required with Shop Drawings or Deferred Approvals) for complete assemblies and complete working systems. Incidental items not indicated on the Drawings, nor mentioned in the Specifications, that can legitimately and reasonably be inferred to belong to the Work described, or be necessary in good practice to provide a complete assembly or system, shall be furnished as though itemized in the Contract Documents in every detail. In all instances, material and equipment shall be installed in strict accordance with each manufacturer's most recent published recommendations and Specifications.

3.3.11 Noise Control

The Contractor shall be responsible for the installation of noise reducing devices on construction equipment. Contractor shall comply with the requirements of the city and county having jurisdiction with regard to noise ordinances governing construction sites and activities. Construction equipment noise is subject to the control of the Environmental Protection Agency's Noise Control Program (Part 204 of Title 40, Code of Federal Regulations). If school is in session at any point during the progress of the Project, and, in the District's reasonable discretion, the noise from such Work disrupts or disturbs the students or faculty or the normal operation of the school, at the District's request, the Contractor shall schedule the performance of all such Work around normal school hours or make other arrangements so that the Work does not cause such disruption or disturbance. There are specific periods of testing at operational schools and it is critical that Contractor control noise during periods of testing. In no event shall Contractor have a right to receive additional compensation or an extension to the Contract time as a result of any such rescheduling or the making of such arrangements. These controls shall be implemented during site preparation and construction. All noise related issues, including school operations, and noise during testing should be detailed in the Schedule provided pursuant to Article 8.

3.3.12 Prevention and Reporting of Workplace Violence

3.3.12.1 *Statutory Requirements.* Each employer required by Labor Code Section 6401.7 to have in effect an Injury and Illness Prevention Plan ("IIPP") must also establish, implement and maintain a written Workplace Violence Prevention Plan in accordance with Labor Code Section 6401.9 ("WVPP"). The WVPP may be incorporated as a stand-alone section of the IIPP, or may be a separate document. As described in Subdivision (b)(2) of Section 6401.9, certain employers, employees, and places of employment may be exempt from the WVPP requirements. However, in accordance with Subdivision (b)(3) of Section 6401.9, and notwithstanding an applicable exemption, the California Department of Industrial Relations, Division of Occupational Safety and Health ("Cal OSHA") may issue special orders requiring compliance with WVPP requirements.

3.3.12.2 *Project WVPP.* Not later than five (5) days following receipt of the Notice of Award, and as a condition precedent to commencing any work or services on or at the Project Site, the Contractor shall provide to the District: (i) a complete and accurate copy of the Contractor's WVPP applicable to the Project ("Project WVPP"); and (ii) the name, position, and telephone number of each person having responsibility for implementing the Project WVPP and receiving reports of workplace violence, if and to the extent that information is not conspicuously specified in the Project WVPP. Notwithstanding the District's receipt of the Project WVPP and related information, and subject to coordination requirements specified in Section 3.3.12.3 herein, the Contractor shall at all times retain sole responsibility for: (i) implementing and maintaining the Project WVPP; and (ii) ensuring compliance with

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Project WVPP requirements by each subcontractor, consultant, supplier, and other entity under contract with or otherwise subject to the Contractor's control that, for any length of time, will be present on or at the Project Site (each an "Other Employer").

3.3.12.3 *Coordination Requirements.* The Contractor shall implement procedures to effectively coordinate the Project WVPP with the District and all Other Employers, to ensure that they and their employees understand their respective roles in connection with the Project WVPP. Such procedures shall ensure that: (i) all employees are trained in regard to workplace violence prevention; (ii) each workplace violence incident involving any employee is reported, investigated, and recorded; and (iii) if any employee experiences a workplace violence incident, the Contractor shall record the information in a violent incident log and shall provide a copy of that log to the District upon request. In addition, and without limiting the foregoing, the Contractor, during weekly safety meetings conducted at the Project Site, shall reiterate the requirements of the Project WVPP and the procedures for reporting and logging workplace violent incidents, and for otherwise complying with requirements of the Project WVPP. The Contractor shall require that all employees who will be on or at the Project Site in connection with the Project (whether employed by the Contractor or any Other Employer) attend (and sign an attendance sheet for) the weekly safety meetings. If attendance at any weekly safety meeting reasonably is not possible with respect to any particular Other Employer (e.g., a supplier whose employee(s) will only temporarily be at the Project Site), the Contractor shall provide and describe directly to each such Other Employer and its applicable employee(s) the requirements of the Project WVPP and the procedures for reporting and logging workplace violent incidents, and for otherwise complying with requirements of the Project WVPP.

3.3.12.4 *Compliance and Indemnification.* In connection with the Project, and without limiting anything else in the Contract, the Contractor shall: (i) fully comply with all applicable requirements of the Project WVPP, Labor Code Section 6401.7, and Labor Code Section 6401.9 (collectively, the "IIPP and WVPP Requirements"); and (ii) ensure that all Other Employers fully comply with all applicable IIPP and WVPP Requirements. With respect to any and each failure by the Contractor or any of the Other Employers to full comply with all applicable IIPP and WVPP Requirements, and in accordance with Section 3.3.12 of these General Conditions, the Contractor shall indemnify, defend, and hold-harmless the District, the District's governing board and each individual member thereof, and the District's other officers, employees, agents and representatives, and each of them.

3.3.13 California Air Resources Board ("CARB")

3.3.13.1 Contractor shall comply, and shall ensure all subcontractors comply, with all applicable requirements of the most current version of the regulations imposed by the California Air Resources Board ("CARB") including, without limitation, all applicable terms of Title 13, California Code of Regulations Division 3, Chapter 9 and all pending amendments ("Fleet Regulation").

3.3.13.2 Throughout the Project, and for three (3) years thereafter, Contractor shall make available for inspection and copying any and all documents or information associated with Contractor's and its subcontractors' fleets including, without limitation, the Certificates of Reported Compliance ("CRCs"), fuel/refueling records, maintenance records, emissions records, and any other information the Contractor is required to produce, keep or maintain pursuant to the Fleet Regulation upon two (2) calendar days' notice from the District.

3.3.13.3 Contractor shall be solely liable for any and all costs associated with compliance with the Fleet Regulation as well as for any and all penalties, fines, damages, or costs associated with any and all violations, or failures to comply with the Fleet Regulation. Contractor shall defend,

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indemnify and hold harmless the District, its officials, officers, employees and agents free and harmless from any claims, liabilities, costs, penalties or interest arising out of any failure or alleged failure to comply with the Fleet Regulation.

3.4 WARRANTY

The Contractor warrants to the District and Architect that material and equipment furnished under the Contract will be of the highest quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. Contractor's warranty to District includes, but is not limited to, the following representations:

3.4.1 In addition to any other warranties provided elsewhere, Contractor shall, and hereby does, warrant all Work after the date of Notice of Completion of Work by District and 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 or materials within a one (1) year period from date of Final Completion which shall be no later than the final date of Punch List as noted at Article 9.11) without expense whatsoever to District, ordinary wear and tear, unusual abuse or neglect excepted. District will give notice of observed defects with reasonable promptness. Contractor shall notify District upon completion of repairs.

3.4.2 In the event of failure of Contractor to comply with above mentioned conditions within one week after being notified in writing, District is hereby authorized to proceed to have defects repaired and made good at expense of Contractor who hereby agrees to pay costs and charges therefore immediately on demand.

3.4.3 If, in the opinion of the District, defective Work creates a dangerous condition or requires immediate correction or attention to prevent further loss to the District, the District will attempt to give the notice required by this Article. If the Contractor cannot be contacted or does not comply with the District's requirements for correction within a reasonable time as determined by the District, the District may, notwithstanding the provisions of this article, proceed to make such correction or attention which shall be charged against Contractor. Such action by the District will not relieve the Contractor of the guarantee provided in this Article or elsewhere in this Contract.

3.4.4 This Article does not in any way limit the guarantee on any items for which a longer warranty is specified or on any items for which a manufacturer gives a guarantee for a longer period. Contractor shall furnish District all appropriate guarantee or warranty certificates upon completion of the project.

3.5 TAXES

Contractor will pay all applicable Federal, State, and local taxes on all materials, labor, or services furnished by it, and all taxes arising out of its operations under the Contract Documents. District is exempt from Federal Excise Tax, and a Certificate of Exemption shall be provided upon request.

3.6 PERMITS, FEES AND NOTICES

3.6.1 Payment

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The Contractor shall secure and pay for all permits and governmental fees, licenses, and inspections necessary for proper execution and completion of the Work which are necessary after execution of the Contract and are legally required by any authority having jurisdiction over the Project, except those required by the Division of the State Architect (DSA). District shall be responsible for all testing and inspection as required by the DSA on-site or within the distance limitations set forth in Article 13.5.2, unless a different mileage range is specified in the Supplemental Conditions.

3.6.1.1 *DSA Fees.* DSA policy is to charge CCD review fees for processing and approval of changes in the Plans and Specifications through the Construction Change Document process. Contractor is specifically directed to the current DSA IR A-30 which provides fee structure and charges that will be incurred for proceeding with respect to the CCD process, a process that must be followed for each change in the Plans and Specifications.

3.6.2 Compliance

The Contractor shall comply with and give notices required by any law, ordinance, rule, regulation, and lawful order of public authorities bearing on performance of the Work. Specifically, the Division of State Architect provides State oversight of the Project and enforcement of Title 24 rules and regulations. Contractor is directed to the DSA website. There will be local governmental oversight from City, County or both. Finally, Regional Water Quality Control Board, State Fire Marshall, local fire marshal, Department of Industrial Relations, Department of Labor Standards Enforcement, and Air Quality Management District (Local and State) are some of the agencies that provide oversight and may require specific permits, fees, or provide oversight over the Project. Contractor represents understanding and specialized knowledge of the rules governing school districts and Contractor shall maintain compliance over the applicable rules and will file all documents required in order to ensure compliance with State, local, and other rules that apply to the Project.

3.6.3 Responsibility

The Contractor shall perform all Work in conformance with every law, statute, ordinance, building code, rule, regulation or order. The Contractor shall assume full responsibility for such Work and shall bear the attributable cost of correction or project delay.

Pursuant to Title 24 Section 4-343(b):

“Contractor shall carefully study the approved Plans and Specifications and shall plan a schedule of operations well ahead of time.... All inconsistencies or items which appear to be in error in the Plans and Specifications shall be promptly called to the attention of the architect or registered engineer, through the inspector, for interpretation or correction.”

To help Contractor plan its operations, Contractor is directed to study the current version of the DSA 152 Inspection Card Manual identifying the exact steps the Inspector is to follow in the review and sign off process for the DSA 152. The DSA 152 Inspection Card Manual provides specific detail as to the order of operations, review items and compliance items beyond the Specifications and Plans which are reviewed for DSA compliance. The most current version of this manual is located on DSA’s website.

Contractor is also specifically directed to the time periods for posting of Special Inspection Reports and Inspector Notifications under DSA PR 13-01 since the timing of Inspection is not a Governmental Entity related delay.

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3.7 SUBMITTALS REQUIRED AT THE COMMENCEMENT OF THE PROJECT

3.7.1 Requirements Within Ten (10) Calendar Days

Within ten (10) calendar days after Notice to Proceed, Contractor shall submit the following:

- 3.7.1.1 Detailed Schedule of Values (See Article 9.2)
- 3.7.1.2 Submittal Listing and Schedule for Submittals
- 3.7.1.3 Critical Path Baseline Schedule (See Article 8)

3.7.2 Requirements Within Thirty-Five (35) Calendar Days

Within thirty-five (35) calendar days after Notice to Proceed, Contractor shall submit the following:

3.7.2.1 *All Submittals for the Project* except those specifically agreed upon by District and Architect, in writing, and shall be specifically incorporated into the Submittal section of the Schedule so as to not delay the Work. The agreement to allow a later Submittal does not mean that Article 3.3.7 is waived. Contractor shall order materials and ensure prices are honored and secured for the Project.

- a. Structural Steel may be included as a later Submittal than 35 days if Structural Steel is a significant portion of the Work, at least one or some of the Project is a structural steel structural system, or as specifically agreed upon by the Architect or District.
- b. It is specifically agreed that submissions of structural steel Submittals shall not be piecemeal (unless some portion is requested separately by the District or Architect), shall provide complete designs, shall be stamped by the structural steel Subcontractor, Contractor, and structural steel Subcontractor's structural engineer at time of submission and as further addressed in Article 3.9.
- c. In no case shall the submission of structural steel Drawings delay the critical path for the schedule. If a Milestone is provided for submission of complete structural steel Shop Drawings then the date shall be no later than as set forth in the Milestone

3.7.2.2 *Exceptions to Submittal Within Thirty-Five (35) Days by Written Agreement.* A written request detailing the specific reasons for a submission later than 35 days due to complexity of design or non-critical path status of the Submittal shall be submitted at the time the Baseline Schedule is submitted. The Baseline Schedule shall not include a delayed Submittal until written agreement is provided. In addition to the request for providing a Submittal after the thirty-five (35) day period, a copy of the Contract with the Subcontractor who shall be performing the Submittal, a written statement from the Subcontractor verifying that work has commenced on the Submittal and providing Subcontractor's own schedule of Milestones and completion dates, and a corresponding Submittal designation in the Schedule as required under Article 8. Approval of a delayed Submittal shall not result in any increase in the Contract Price or result in an extension of time for the completion of the Project.

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3.7.2.3 *Piecemeal Submissions of Submittals.* Piecemeal Submittals mean providing portions of Shop Drawings or Submittals as they are being completed. The submission of piecemeal Submittals results in the appearance of a submission when there is inadequate information for the Architect or Engineer to adequately review a submission. Piecemeal differs from submission of complete buildings or phases of buildings or complete assemblies. The Architect may agree to allow submission of single buildings or areas as long as the Submittals are complete. .

3.8 DOCUMENTS, SAMPLES, AND COMPUTER AT THE SITE

The Contractor shall maintain at the Site for the District one current copy of the California Building Code, Titles 19 and 24 of the California Code of Regulations, any other document required by DSA, and one record copy of the Drawings, Specifications, Addenda, Change Orders, and other Modifications, in good order and marked currently to record changes and selections made during construction. In addition, the Contractor shall maintain at the Site approved Shop Drawings, Product Data, Samples, and similar required Submittals. These documents shall be available to the Architect and shall be delivered to the Architect for delivery to the District upon completion of the Work.

Contractor shall have an operational computer with internet access so Contractor can review and post documents as required for the Project, including but not limited to the filing and posting of DSA required documents for the Project.

Contractor shall be prepared to review documents posted to the DSA Project website.

3.9 SUBMITTALS INCLUDING SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

3.9.1 Definitions

3.9.1.1 *Deferred Approvals.* Approval of certain aspects of the construction may be deferred until the construction Contract has been awarded. To facilitate the design process, DSA grants Deferred Approval to the design and detailing of certain elements of the Project at the request of the Architect or Engineer of Record. Design elements that may be deferred may include, but are not limited to access floors, bleachers, elevator guide rails and related elevator systems, exterior wall systems - precast concrete, glass fiber reinforced concrete, etc., skylights, window wall systems, storefronts, stage rigging, and other systems as noted in the Contract Documents. (Also see Article 1.2.2.2 and 3.9.3)

3.9.1.2 *Shop Drawings.* The term “Shop Drawings” as used herein means Drawings, diagrams, equipment or product schedules, and other data, which are prepared by Contractor, Subcontractors, manufacturers, suppliers, or distributors illustrating some portion of the Work, and includes: illustrations; fabrication, erection, layout and setting Drawings; manufacturer’s standard Drawings; schedules; descriptive literature, instructions, catalogs, and brochures; performance and test data including charts; wiring and control diagrams; and all other Drawings and descriptive data pertaining to materials, equipment, piping, duct and conduit systems, and methods of construction as may be required to show that the materials, equipment, or systems and their position conform to the requirements of the Contract Documents.

3.9.1.3 *Manufactured* applies to standard units usually mass-produced, and “Fabricated” means items specifically assembled or made out of selected materials to meet individual design requirements. Shop Drawings shall: establish the actual detail of all manufactured or Fabricated items, indicate proper relation to adjoining work, amplify design details of mechanical and electrical

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systems and equipment in proper relation to physical spaces in the structure, and incorporate minor changes of design or construction to suit actual conditions.

3.9.1.4 *Submittals* is a term used interchangeably and sometimes refers to Shop Drawings, Product Data, and samples since all Subcontractor submissions are tracked in a Submittal Log and may include any of the noted items. However, generally, a Submittal is a manufacturer's product information and Product Data including description, characteristics, size, physical characteristics, and requirements to prepare the jobsite for receiving of the particular manufactured item.

3.9.1.5 *Samples*. The term "samples" as used herein are physical examples furnished by Contractor to illustrate materials, equipment, or quality and includes natural materials, Fabricated items, equipment, devices, appliances, or parts thereof as called for in the Specifications, and any other samples as may be required by the Architect to determine whether the kind, quality, construction, finish, color, and other characteristics of the materials, etc., proposed by the Contractor conform to the required characteristics of the various parts of the Work. All Work shall be in accordance with the approved samples.

3.9.2 Shop Drawings.

3.9.2.1 *When Shop Drawings Are Required*. Shop Drawings are required for prefabricated components and for installation and coordination of these prefabricated components into the Project. In addition, Shop Drawings, are prepared to address the actual size and installation of components from various Subcontractors and provides an opportunity for the Contractor to coordinate and address conflicts between the subcontracting trades. In some cases, each Subcontractor or trade will provide Shop Drawings in a BIM format or other format as agreed by District.

3.9.2.2 *Purpose for Shop Drawings*. Shop Drawings are the Contractor's manufacturer, Subcontractor, supplier, vendor or the Contractor's detailed drawings showing particularized method for assembly, specifics to a manufacturer, manufacturer component installation requirements, specifics as to a manufactured item, alterations to a manufactured, a custom created item, or drawn version of more detailed information expanding on the Architect's design shown in the Contract Documents. The Shop Drawings address the appearance, performance, size, weight, characteristics and prescriptive descriptions associated with the Contractor or Contractor's Subcontractor's plan for installation or assembly based on the design in the Specifications and Contract Documents. The Shop Drawing often is more detailed than the information shown in the Contract Documents to give the Architect and Engineer the opportunity to review the fabricator's version of the product (along with particulars specific to that particular product), prior to fabrication. References to the Contract Documents, Construction Documents, Drawings, Plans, and Specifications assist the Architect and Engineer in their review of the Shop Drawings. Attachment of manufacturer's material Specifications, "catalog cut sheets," and other manufacturer's information may be provided to accompany Shop Drawings. Because Shop Drawings facilitate the Architect's and Engineer's approval of the system, they should be as clear and complete as possible so they may be reviewed by Architect or Engineer for the Project.

3.9.2.3 *Shop Drawing Requirements*. The Contractor shall obtain and submit with Shop Drawings all seismic and other calculations and all Product Data from equipment manufacturers. "Product Data" as used herein are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate a material, product, or system for some portion of the Work.

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3.9.2.4 *Not a Reproduction of Architectural or Engineering Drawings.* The Shop Drawings are not a reproduction of the architectural or engineering Drawings. Instead, they must show more detail than the Construction Documents and details the fabrication and/or installation of the items to the manufacturer's production crew or Contractor's installation crews.

3.9.2.5 *Shop Drawings Engineering Requirements:* Some Shop Drawings require an engineer stamp to be affixed on the Drawings and calculations. In such cases, a current and valid engineering stamp shall be affixed by a California registered engineer. No out of State engineers shall stamp Shop Drawings. (See DSA IR A-18). In most cases, an engineer means California registered mechanical, structural, electrical or plumbing engineer. California Registered Civil Engineers will not be accepted for structural details unless specifically approved by DSA.

3.9.2.6 *DSA Approvals Required Prior to Work.* No work on a Shop Drawing that requires DSA approval may proceed until DSA approval is received. Contractor has provided DSA approval time and allowed adequate time for corrections in Contractor's Schedule as required pursuant to Article 8.

3.9.2.7 *Shop Drawing Identification.* All Shop Drawings must be properly identified with the name of the Project and dated, and accompanied by a letter of transmittal referring to the name of the Project and to the Specification section number for identification of each item clearly stating in narrative form, as well as "clouding" all qualifications, departures, or deviations from the Contract Documents. Shop Drawings, for each section of the Work shall be numbered consecutively and the numbering system shall be retained throughout all revisions. All Subcontractor submissions shall be made through the Contractor. Each drawing shall have a clear space for the stamps of Architect and Contractor.

3.9.3 Deferred Approvals

Deferred approvals shall be submitted and processed to ensure all DSA and other governmental approvals are secured so as to not delay the Project. There may be additional requirements for Deferred Approvals at Division 1 of the Specifications. All Deferred Approvals shall be prepared by Contractor or Contractor's agent early enough so as to not delay the Project. Contractor is aware that Title 24 California Code of Regulations Section 4-317 have specific requirements for Deferred Approval as to governing agencies and as to the Architect and Engineer for the Project. As a result, any delay associated with the time for approval by applicable agencies or by the Architect or Architect's consultants shall be Contractor's. Contractor is required to comply with inclusion of Deferred Approvals in the Schedule as required under Article 3.9.6*DSA Approvals Required Prior to Work.* No work on a Deferred Approval item may proceed on the components until DSA approval is received. Contractor has provided DSA approval time and allowed adequate time for any DSA revisions in Contractor's Schedule as required pursuant to Article 8.

3.9.4 Submittals and Samples

3.9.4.1 *Information Required With Submittals:* Manufacturer, trade name, model or type number and quantities: Information provided must be of sufficient detail to allow Architect and Engineer to compare the submitted item with the specified products and acceptable products listed, in the Specifications and addenda.

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3.9.4.2 *Description of Use and Performance Characteristics:* Information should be furnished describing the normal use and expected performance of the product. The Architect and Contractor review this information to confirm that the product is appropriate for the intended use.

3.9.4.3 *Size and Physical Characteristics:* The size and physical characteristics, such as adjustment capabilities, which is reviewed by both the Contractor and Architect. The Contractor has the most available information for comparing adjoining materials and equipment. The Contractor also needs to know the size and weight of the equipment for lifting and handling considerations.

3.9.4.4 *Finish Characteristics:* The Architect reviews the available finishes and selects the appropriate finish, if the finish was not previously specified in the documents. The Contractor should confirm that finish requirements in the Specifications are being met by the product.

3.9.4.5 *Contractor Responsible for Jobsite Dimensions:* Some material is custom-fabricated to job conditions, requiring dimensions from the jobsite. These jobsite dimensions are provided by the Contractor as part of the Contractor's responsibilities for the Project and shall be provided prior to release of the product for manufacture. Contractor shall not rely on Architect or Engineers to provide jobsite dimensions.

3.9.4.6 *Full Range of Samples Required (When Specific Items Not Specified).* Except in cases where the exact color and type of item is specified since the District is utilizing items Standardized or pre-selected by District, the full range of color, graining, texture, or other characteristics are anticipated for review in finished products, a sufficient number of samples of the specified materials shall be furnished by the Contractor to indicate the full range of characteristics which will be present in the finished products. Products delivered or erected without Submittal and approval without providing a full range of samples shall be subject to rejection. Except for range samples, and unless otherwise called for in the various sections of the Specifications or Specification Section 1, samples shall be submitted in duplicate.

3.9.4.7 *Labeling of Samples.* All samples shall be marked, tagged, or otherwise properly identified with the name of the submitting party, the name of the Project, the purpose for which the samples are submitted and the date.

3.9.4.8 *Transmittal letter.* All samples shall be accompanied by a letter of transmittal containing similar information, together with the Specification section number.

3.9.4.9 *Labels and Instructions.* All samples of materials shall be supplied with the manufacturer's descriptive labels and application instructions. Each tag or sticker shall have clear space for the review stamps of Contractor and Architect.

3.9.4.10 *Architect's Review.* The Architect will review and, if appropriate, approve submissions and will return them to the Contractor with the Architect's stamp and signature applied thereto, indicating the timing for review and appropriate action in compliance with the Architect's (or District's) standard procedures. In the cases where a CM is hired by the District, CM may be the party that receives and performance logging and initial processing of the Samples. CM may, in some cases, reject samples that are not in conformance with Contract requirements.

3.9.5 Submittal Submission Procedure

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3.9.5.1 *Transmittal Letter and Other Requirements.* All Submittals must be properly identified with the name of the Project and dated, and each lot submitted must be accompanied by a letter of transmittal referring to the name of the Project and to the Specification section number for identification of each item clearly stating in narrative form, as well as “clouding” on the submissions, all qualifications, departures, or deviations from the Contract Documents. Shop Drawings, for each section of the Work shall be numbered consecutively and the numbering system shall be retained throughout all revisions. All Subcontractor submissions shall be made through the Contractor. Each drawing shall have a clear space for the stamps of Architect and Contractor. Refer to Division 1. In the case where a CM is hired on the Project, the CM may be designated to receive the Submittals for the Project, log the Submittals, and in some cases reject Submittals that do not conform to Contract requirements. Submittal Procedures for further information.

3.9.5.2 *Copies Required.* Each Submittal shall include one (1) legible, reproducible (if electronic is available, electronic copies shall also be provided) and five (5) legible prints of each drawing or schedule, table, cut sheet, etc., including fabrication, erection, layout and setting drawings, and such other drawings as required under the various sections of the Specifications, until final acceptance thereof is obtained. Subcontractor shall submit copies, in an amount as requested by the Contractor, of: (1) manufacturers’ descriptive data for materials, equipment, and fixtures, including catalog sheets showing dimensions, performance, characteristics, and capacities; (2) wiring diagrams and controls; (3) schedules; (4) all seismic calculations and other calculations; and (5) other pertinent information as required by the District or Architect. (See also Division 1)

3.9.5.3 *Corrections.* The Contractor shall make all corrections required by Architect, District or CM and shall resubmit, as required by Architect or CM, corrected copies of Shop Drawings or new samples until approved. Contractor shall direct specific attention in writing or on resubmitted Shop Drawings to revisions other than the corrections required by the Architect on previous submissions. Professional services required for more than one (1) re-review of required Submittals of Shop Drawings, Product Data, or samples are subject to charge to the Contractor pursuant to Article 4.5.

3.9.5.4 *Approval Prior to Commencement of Work.* No portion of the Work requiring a Shop Drawing or sample submission or other Submittal shall be commenced until the submission has been reviewed by Contractor and Architect (and CM, if applicable) and approved by Architect (and CM where applicable) unless specifically directed in writing by the Architect. All such portions of the Work shall be in accordance with approved Shop Drawings and samples.

3.9.5.5 *District’s Property.* All Submittals, Shop Drawings, computer disks, BIM modeling information, clash checks, schedules, annotated Specifications, samples and other Submittals shall become the District’s property upon receipt by the District or Architect.

3.9.6 Schedule Requirements for Submittals

Contractor shall obtain and shall submit all required Submittals (i.e. Shop Drawings, Deferred Approvals, Samples, etc.), in accordance with Contractor’s “Schedule for Submission of Shop Drawings and Samples” as required in the scheduling portion of the General Conditions at Articles 8 and the Specifications (as long as the Specifications do not conflict with General Conditions. In the case of conflict, the conflicting provision shall be controlled by the General Conditions and the remaining Specifications sections shall be interpreted as if the general conditions language is inserted) with such promptness as to cause no delay in its own Work or in that of any other contractor or subcontractor but in no event later than thirty five (35) days after the Notice to Proceed is issued except in the specific cases

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noted as an exception under Article 3.7.2.1. No extensions of time will be granted to Contractor or any Subcontractor because of its failure to have Shop Drawings and samples submitted in accordance with Division 1 and the Schedule. Each Subcontractor shall submit all Shop Drawings, samples, and manufacturer's descriptive data for the review of the District, the Contractor, and the Architect through the Contractor.

3.9.6.1 *Consideration of Schedule.* Contractor has considered lead times, DSA or other agency governmental review times, Architect or Engineer review times, manufacturing seasons, and specific long lead procurement concerns for all submittals for the Project.

3.9.7 General Submittal Requirements

3.9.7.1 *Contractor Submittal Representations and Coordination.* By submitting Shop Drawings, Product Data, samples, etc., the Contractor represents that it has determined and verified all materials, field measurements, catalog numbers, related field construction criteria, and other relevant data in connection with each such submission, and that it has checked, verified, and coordinated the information contained within such Submittals with the requirements of the Work and of the Contract Documents, including the construction schedule.

3.9.7.2 *Contractor Coordination.* Contractor shall stamp, sign, and date each Submittal indicating its representation that the Submittal meets all of the requirements of the Contract Documents and evidence Contractor's review through execution of the following stamp to be placed on each Shop Drawings:

“[Contractor] has reviewed and approved the field dimensions and the construction criteria, and has also made written notation regarding any information in the Shop Drawings and Submittals that does not conform to the Contract Documents. This Shop Drawing or Submittal has been coordinated with all other Shop Drawings and Submittals received to date by me as Contractor and this duty of coordination has not been delegated to Subcontractors, material suppliers, the Architect, or the Engineers on this Project.

Signature of Contractor and date

3.9.7.3 *No Deviation from Contract Documents.* The submission of the Shop Drawings, Product Data, samples, etc., shall not deviate from the *requirements* of the Contract Documents including detailing and design intent which is specifically outlined in Contract Documents except as specifically authorized by the Architect or through an accepted substitution pursuant to Article 3.10.4. All deviations from the Contract Documents shall be narratively described in a transmittal accompanying the Shop Drawings. However, Shop Drawings shall not be used as a means of requesting a substitution, the procedure for which is defined in Article 3.10.4, “Substitutions.”

3.9.7.4 *Contractor Responsibility for Shop Drawings Conformance to Contract Documents.* Review by District and Architect shall not relieve the Contractor or any Subcontractor from its responsibility in preparing and submitting proper Shop Drawings in accordance with the Contract Documents.

3.9.7.5 *Incomplete Submittals.* Any submission, which in Architect's opinion is incomplete, contains errors, or has been checked superficially, will be returned not reviewed by the

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Architect for resubmission by the Contractor. Refer to Submittal Procedures of the Specifications for additional information. The Contractor shall be responsible for any related delays and shall not be the basis for any Claim.

3.9.7.6 *Shop Drawings and Submittals Shall Not Be Used as a Method to Make a Substitution.* Shop Drawings and Submittals shall not be used as a means of requesting a substitution or to make changes in the Contract Documents. If changes are made to the Contract Documents through the Shop Drawings, the Architect shall have the right to reject the Submittal. If the Architect does not note the deviation from the approved Plans and Specifications, the Contractor is still responsible for the change and the Architect or the District may require the Shop Drawings be revised to properly reflect the approved Contract Documents. The Architect or District may also require that the Contractor bear all costs under Article 4.5 and consequential damages associated with a CCD to revise Plans and Specifications to accommodate the deviation from approved Plans and Specifications.

3.9.7.7 Extent of Review. In reviewing Shop Drawings, the Architect will not verify dimensions and field conditions. The Architect will review and approve Shop Drawings, Product Data, samples, etc., for aesthetics and for conformance with the design concept of the Work and the information in the Contract Documents. The Architect's review shall neither be construed as a complete check which relieves the Contractor, Subcontractor, manufacturer, fabricator, or supplier from responsibility for any deficiency that may exist or from any departures or deviations from the requirements of the Contract Documents unless the Contractor has, in writing, called the Architect's attention to the deviations at the time of submission. The Architect's review shall not relieve the Contractor or Subcontractors from responsibility for errors of any sort in Shop Drawings or schedules, for proper fitting of the Work, coordination of the differing Subcontractor trades and Shop Drawings and Work which is not indicated on the Shop Drawings at the time of submission of Shop Drawings. Contractor and Subcontractors shall be solely responsible for any quantities which may be shown on the Submittals or Contract Documents.

3.10 SUBSTITUTIONS

3.10.1 Definition

A Substitution is a change in product, material, equipment, or method of construction from those required by the Construction Documents proposed by the Contractor. For this Project, a Substitution is subject to the filing of a Construction Substitution Request Form at the time of bid and meeting the requirements of this Article.

3.10.2 One Product Specified

Unless the Specifications state that no substitution is permitted, whenever the Contract Documents indicate any specific article, device, equipment, product, material, fixture, patented process, form, method, or type of construction or any specific name, make, trade name, or catalog number, with or without the words "or equal," such specification shall be deemed to be used for the purpose of facilitating description of the material, process, or article desired and shall be deemed to be followed by the words "or equal." Subject to the requirements of properly submitting a Substitution Request for as Addressed in Article 3.10.4, the Contractor may, unless otherwise stated, offer any material, process, article, etc., which shall be materially equal or better in every respect to that so indicated or specified ("Specified Item") and will completely accomplish the purpose of the Contract Documents.

3.10.3 Products Specified Which Are Commercially Unavailable

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If the Contractor fails to make a request for substitutions for products, prior to the submission of its bid, and such products subsequently become commercially unavailable, the Contractor may request a substitution for such commercially unavailable item. The decision to grant this request is solely at the District's discretion. The written approval of the District, consistent with the procedure for Change Orders, shall be required for the use of a proposed substitute material. The District may condition its approval of the substitution upon the delivery to District of an extended warranty or other assurances of adequate performance of the substitution as well as an equitable deduction in the Contract Price should the substituted item cost less than the Specified Item. All risks of delay due the approval of a requested substitution by the DSA, or any other governmental agency having jurisdiction, shall be on the requesting party. All additional costs, DSA review costs, all procurement and construction delays, and all costs for review by the Architect or its consultants shall be the responsibility of the Contractor and will be deducted from Contractor's pay request.

3.10.4 Substitution Request Form

Requests for substitutions of products, materials, or processes in place of a Specified Item must be in writing on the District's Substitution Request Form ("Request Form") at the time of submitting bids to the District, except as provided for in Article 3.10.3.

The Request Form must be accompanied by evidence as to whether the proposed substitution:

- a. Is equal in quality/service/ability to the Specified Item;
- b. Will entail no changes in detail, construction, and scheduling of related work;
- c. Will be acceptable in consideration of the required design and artistic effect;
- d. Will provide no cost disadvantage to the District;
- e. Will require no excessive or more expensive maintenance, including adequacy and availability of replacement parts; and
- f. Will required no change of the construction schedule.

In completing the Request Form, the bidder must state, with respect to each requested substitution, whether the bidder will agree to provide the Specified Item in the event that the District denies the bidder's request for such requested substitution. In the event that the bidder has agreed in the Request Form to provide the Specified Item and the District denies the bidder's requested substitution for a Specified Item, the bidder shall provide the Specified Item without any additional cost or charge to the District.

After bids are opened, the apparent lowest bidder shall provide, within five (5) days of opening such bids, any and all Drawing, Specifications, samples, performance data, calculations, and other information, as may be required to assist the Architect, CM and the District in determining whether the proposed substitution is acceptable. The burden of establishing these facts shall be upon the bidder.

After the District's receipt of such evidence by the bidder, the District will make its final decision as to whether the bidder's request for substitution for any Specified Items will be granted. The decision as to whether a proposed request for substitution is equal to a Specified Item shall be at the sole

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discretion of the District. Any request for substitution that is granted by the District shall be documented and processed through a Change Order. Contractor must submit a complete Submittal of the requested substitution and a Shop Drawing showing configuration, dimensions, and other critical information associated with the substitution that meets the requirements of Article 3.9. The District may condition its approval of any substitution upon delivery to the District of an extended warranty or other assurances of adequate performance of the substitution. Any and all risks of delay due to approval by the DSA or any other governmental agency having jurisdiction shall be on the bidder.

If the Architect and District accept a proposed substitution, the Contractor agrees to pay for all DSA review costs, engineering and design services, including, without limitation, compensation to the Architect and affected engineers for their required time to process such substitution through the Division of the State Architect, if required, and to make all changes and adjustments in materials or the work of all trades directly or indirectly affected by the substituted item or items at no cost to the District.

3.10.5 Substitution Requests After Bid

The District, in its sole discretion, may accept a request for substitution by the Contractor or may request Contractor substitute a specified item. Any substitutions requested after bids are opened shall be subject to the same conditions and requirements set forth in Article 3.10.4 above. If any substitutions, that in the District or Architect's determination, results in a credit to the District, the credit amount shall be agreed upon in writing, otherwise, the request for substitution shall be deemed denied.

3.11 INTEGRATION OF WORK

3.11.1 Scope

The Contractor shall be responsible for cutting, fitting, or patching to complete the Work and to make all parts fit together properly. Contractor shall be responsible for ensuring that all trades are coordinated and scheduled so as to ensure the timely and proper execution of the work. When modifying existing work or installing new Work adjacent to existing work, Contractor shall match, as closely as conditions of Site and materials will allow, the finishes, textures, and colors of the original work, refinishing existing work at no additional cost to District. All cost caused by defective or ill-timed work shall be borne by Contractor. Contractor shall be solely responsible for protecting existing work on adjacent properties and shall obtain all required permits for shoring and excavations near property lines.

3.11.2 Structural Members

New or existing structural members and elements, including reinforcing bars and seismic bracing, shall not be cut, bored, or drilled except by written authority of the Architect. Work done contrary to such authority is at the Contractor's risk and subject to replacement at its own expense without reimbursement under the Contract. Schedule delays resulting from Agency approvals for unauthorized work shall be the Contractor's responsibility.

3.11.3 Subsequent Removal

Permission to patch any areas or items of the Work shall not constitute a waiver of the District's or the Architect's right to require complete removal and replacement of the areas or items of the Work if, in the opinion of the Architect or the District, the patching does not satisfactorily restore quality and appearance of the Work or does not otherwise conform to the Contract Documents.

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3.12 CLEANING UP

3.12.1 Contractor's Responsibility to Clean Up

Contractor at all times shall keep premises free from debris such as waste, dust, excess water, storm water runoffs, rubbish, and excess materials and equipment. Contractor shall not leave debris under, in, or about the premises, but shall promptly remove same from the premises and dispose of it in a lawful manner. Disposal receipts or dump tickets shall be furnished to the Architect within five (5) days of request.

Contractor shall remove rubbish and debris resulting from the Work on a daily basis. Contractor shall maintain the structures and Site in a clean and orderly condition at all times until acceptance of the Project by the District. Contractor shall keep its access driveways and adjacent streets, sidewalks, gutters and drains free of rubbish, debris and excess water by cleaning and removal each day. All concrete, sidewalks, and paths of travel shall be broom cleaned daily.

3.12.2 General Final Clean-Up

Upon completion of Work, Contractor shall employ experience workers or professional cleaners for final cleaning. Contractor shall clean each surface to the condition expected in a normal, commercial, building cleaning and maintenance program including, but not limited to, the performance of the following:

- a. Clean interior and exterior of buildings, 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;
- b. Clean the Project site. The grounds should be cleared of any Contractor equipment, raked clean of debris and trash removed. Sweep paved areas broom clean;
- c. Repair or replace any damaged materials. Replace any chipped or broken glass;
- d. Remove any and all stains;
- e. Remove labels that aren't permanent labels;
- f. Clean and polish all glass, plumbing fixtures, equipment, finish hardware and similar finish surfaces. Remove any glazing compounds;
- g. Remove temporary utilities, fencing, barricades, planking, sanitary facilities and similar temporary facilities from Site;
- h. Remove temporary film that remains on any hardware, doors or other surfaces; and
- i. Seal the bottom and tops of all doors.

3.12.3 Special Clean-Up.

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In addition to the general cleaning, the following special cleaning shall be done at the completion of the Work in accordance with the Specifications including, but not limited to:

- a. Remove putty stains from glazing, then wash and polish glazing;
- b. Remove marks, stains, fingerprints and other soil or dirt from painted, stained or decorated work;
- c. Remove temporary protection and clean and polish floors and waxed surfaces;
- d. Clean and polish hardware and plumbing trim; remove stains, dust, dirt, plaster and paint;
- e. Wipe surfaces of mechanical and electrical equipment;
- f. Remove spots, soil, plaster and paint from tile work, and wash tile;
- g. Clean all fixtures and equipment, remove excess lubrication, clean light fixtures and lamps, polish metal surfaces;
- h. Vacuum-clean carpeted surfaces; and
- i. Remove debris from roofs, down spout and drainage system.

3.12.4 Failure to Cleanup

If the Contractor fails to clean up as provided in the Contract Documents, the District may do so, and the cost thereof shall be the responsibility of the Contractor pursuant to Article 2.2 and seek a Deductive Change Order.

3.13 ACCESS TO WORK

The Contractor shall provide the District, the Architect, Engineers and the Inspector of Record, access to the Work in preparation and progress wherever located. Contractor shall provide safe and proper facilities for such access so that District's representatives may perform their functions.

CONTRACTOR IS AWARE THAT THIS CONTRACT MAY BE SPLIT INTO SEVERAL PHASES AS ADDRESSED IN ARTICLE 6.

3.13.1 Special Inspection, Inspections or Tests Out of State, Out of Country or Remote from Project

If Contractor has a Subcontractor or supplier that requires in plant or special inspections or inspections or tests that are out of the country, out of the state, or a distance of more than 200 miles from the Project site, the Special Inspector or Inspector shall be provided access so the special inspection or inspection may occur in the remote location. In some cases, the DSA Inspector may also require access in addition to Special Inspectors and individuals performing tests. Inspections/tests shall occur during normal work hours. (See also Article 4.3.6)

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3.14 ROYALTIES AND PATENTS

3.14.1 Payment and Indemnity for Infringement

Contractor shall hold and save the District and its officers, agents, and employees, the Construction Manager, the Architect, and the Architect's consultants harmless from liability of any nature or kind, including cost and expense, for or on account of any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of the Contract, including its use by the District, unless otherwise specifically provided in the Contract Documents, and unless such liability arises from the sole negligence, or active negligence, or willful misconduct of the District, the Architect, or the Architect's consultants.

3.14.2 Review

The review by the Architect of any method of construction, invention, appliance, process, article, device, or material of any kind shall be for its adequacy for the Work and shall not be an approval for the use by the Contractor in violation of any patent or other rights of any person or entity.

3.15 INDEMNIFICATION

3.15.1 Contractor

See Agreement Form. Contractor shall ensure that its contract with each of its Subcontractors contains provisions requiring the Subcontractors to defend, indemnify and hold harmless the District, Architect, Inspector, the State of California to a minimum level as set forth in this Article and consistent with the indemnity and hold harmless language in the Agreement Form.

3.16 SUBMISSION OF DAILY REPORTS

3.16.1 General

By 10:00 a.m. on the following business day, the Contractor shall submit a Daily Report to the Inspector and copy the Architect for the previous day's Work. If there is a Construction Manager, the original Daily Report is to be provided to the Construction Manager and copies sent to the Architect and the Inspector. Daily Reports shall be prepared on forms approved by the District, together with applicable delivery tickets, listing all labor, materials, and equipment involved for that day. The District reserves the right to note inconsistencies or inaccuracies in the Daily Reports. In such cases, pertinent notes shall be entered by each party to explain points which cannot be resolved that day. Each party shall retain a signed copy of the report. Daily Reports by Subcontractors or others shall be submitted through the Contractor.

3.16.2 Labor

The Daily Report shall show names of workers, classifications, hours worked and hourly rate. The locations where work occurred shall also be identified in the Daily Report. Project superintendent expenses are not allowed.

3.16.3 Materials

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The Daily Report required shall describe and list quantities of materials used and unit costs.

3.16.4 Equipment

The Daily Report required shall show type of equipment, size, identification number, and hours of operation, including loading and transportation, if applicable, and hourly/daily cost. Move-on and move-off fees shall be noted.

3.16.5 Other Services and Expenditures

Other services and expenditures shall be described in the Daily Report in detail as the District requires.

3.16.6 Failure to Submit Daily Report

If Contractor does not submit its Daily Report by 10 am the next business day, the Inspector of Record shall prepare a Daily Report addressing each of the above items. The cost for the Inspector's services to prepare the Daily Report shall be addressed through a Deductive Change Order under Article 7.7.4.

3.17 AS-BUILT DRAWINGS AND ANNOTATED SPECIFICATIONS

Throughout the duration of the Project, Contractor shall maintain on a current basis an accurate and complete set of As-Built Drawings (and Annotated Specifications) clearly showing all changes, revisions to Specifications and substitutions during construction, including, without limitation, field changes and the final location of all electrical and mechanical equipment, utility lines, ducts, outlets, structural members, walls, partitions, and other significant features. In case a Specification allows Contractor to elect one of several brands, makes, or types of material or equipment, the annotations shall show which of the allowable items the Contractor has furnished. The Contractor will update the As-Built Drawings and Annotated Specifications as often as necessary to keep them current, but no less often than weekly.

Contractor shall update As-Built Drawings with complete information on an area of Work at or near the time when the Work is being performed and prior to any DSA 152 sign off and prior to any Work being covered.

The As-Built Drawings and Annotated Specifications shall be kept at the Site and available for review and inspection by the District and the Architect. Failure to maintain and update the As-Built Drawings is a basis to withhold Progress Payments pursuant to Article 9.6.

3.17.1 Upon Beneficial Occupancy

Contractor shall obtain and pay for reproducible Plans upon Beneficial Occupancy. Contractor shall deliver Plans to District Representative (Construction Manager if one is hired for the Project).

3.17.2 As-Built at Completion of Work

Upon completion of the Work and prior to and as a condition precedent to Application for Retention Payment, the Contractor will provide one neatly prepared and complete set of As-Built Drawings

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and Annotated Specifications to the District. Contractor shall certify the As-Builts as a complete and accurate reflection of the actual construction conditions of the Work by affixing a stamp indicating the Drawings are As-Builts and certifying accuracy on the final set of As-Builts. Failure to deliver a complete As-Built set of Drawings may result in significant withholdings to ensure Work is properly documented. (See Article 9.9.2)

3.17.3 Log of Control and Survey Documentation

Contractor shall complete and maintain an accurate log or all control and survey documentation for the Project as the Work progresses. All reference and control points shall be recorded on the As-Built Drawings. The basis of elevations shall be one of the established benchmarks that must be maintained on the As-Builts.

3.17.4 Record Coordinates for Key Items

Contractor shall record, by coordinates, all utilities on-site with top of pipe elevations, major grade and alignment changes, rim, grate or top of curb and flow line elevations of all drainage structures and sewer manholes. Contractor shall update record information at or near the time when work is occurring in an area and prior to DSA 152 sign off on any category of Work and prior to covering the Work.

3.17.5 BIM As-Built Drawings

If BIM is utilized for the Project, then an electronic version of such As-Built Drawings and Annotated Specifications will be delivered to District (in an acceptable format to District).

3.18 EQUIPMENT MANUALS

Contractor shall obtain and furnish three (3) complete sets of manuals containing the manufacturers' instructions for maintenance and operation of each item of equipment and apparatus furnished under the Contract Documents and any additional data specifically requested under the various sections of the Specifications for each division of the Work. The manuals shall be arranged in logical, sequential order, labeled, indexed, and placed in three-ring binders. At the completion of its Work, the Contractor shall certify, by endorsement thereon, that each of the manuals is complete, accurate, and covers all of its Work. Prior to submittal of Contractor's Application for Retention Payment, and as a further condition to its approval by the Architect, each Subcontractor shall deliver the manuals, arranged in logical, sequential order, labeled, indexed, endorsed, and placed in three-ring binders, to the Contractor, who shall assemble these manuals for all divisions of the Work, review them for completeness, and submit them to the District through the Architect.

3.19 DIR REGISTRATION

Strict compliance with all DIR registration requirements in accordance with Labor Code sections 1725.5 and 1771.1 is a material obligation of the Contractor and all of its subcontractors (of any tier) under the Contract Documents. The foregoing includes, without limitation, compliance with DIR registration requirements at all times during performance of the Work by the Contractor and all of its subcontractors of any tier. The failure of the Contractor and all subcontractors of any tier to be properly registered with DIR at all times during performance of the Work is a material breach of the Contract and subject to termination for cause.

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An affirmative and ongoing obligation of the Contractor under the Contract Documents is the verification that all subcontractors of any tier are at all times during performance of the Work are in full and strict compliance with the DIR registration requirements. The Contractor shall not permit or allow any subcontractor of any tier to perform any Work without the Contractor's verification that all subcontractors are in full and strict compliance with the DIR registration requirements. Any subcontractors of any tier not properly registered with DIR shall be substituted in accordance with Labor Code section 1771.1. Contractor or its subcontractors of any tier shall not be entitled to any additional costs or time arising from or in any way related to compliance with the DIR registration requirements.

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ARTICLE 4 ADMINISTRATION OF THE CONTRACT AND CLAIMS

4.1 ARCHITECT

4.1.1 Replacement of Architect

In the case of the termination of the Architect, the District may appoint an Architect or another construction professional or may perform such functions with its own licensed professional personnel. The status of the replacement Architect under the Contract Documents shall be the same as that of the former Architect.

4.2 ARCHITECT'S ADMINISTRATION OF THE CONTRACT

4.2.1 Status

Pursuant to Titles 2 of the California Code of Regulations and as required pursuant to the Field Act, Education Code 17280 et seq., the Architect will provide administration of the Contract Documents and the Work, and will be the District's representative during construction, as well as during the one (1) year period following the commencement of any warranties. The Architect will have authority to act on behalf of the District only to the extent provided in the Contract Documents.

4.2.2 Site Visits

The Architect will visit the Site at intervals necessary in the judgment of the Architect to become generally familiar with the progress and quality of the Work and to determine in general if the Work is being performed in accordance with the Contract Documents and as otherwise required by DSA.

4.2.3 Limitations of Construction Responsibility

The Architect, District and CM shall not have control over, charge of, or be responsible for construction means, methods, techniques, schedules, sequences or procedures, fabrication, procurement, shipment, delivery, receipt, installation, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's responsibility under the Contract Documents. The Architect, District and CM shall not be responsible for the Contractor's, Subcontractors', material or equipment suppliers', or any other person's schedules or failure to carry out the Work in accordance with the Contract Documents. The Architect, District and CM shall not have control over or charge of acts or omissions of the Contractor, Subcontractors, their agents or employees, or any other persons or entities performing or supplying portions of the Work. The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect, District or CM in the Architect, District or CM's administration of the Contract Documents, or by tests, inspections, or approvals required or performed by persons other than the Contractor.

4.2.4 Communications Facilitating Contract Administration

Except where a CM is on the Project, or as otherwise provided in the Contract Documents or when direct communications are warranted by special circumstances, the District and the Contractor shall communicate through the Architect. In the cases where a CM is hired for the Project, all

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communication shall be through the CM (unless otherwise directed) with copies to the District, Architect and Inspector. Where direct communication is necessary between the District and the Contractor, the District's communication shall be through the District's authorized designated person. The Architect and CM shall be promptly informed, and shall receive copies of all written communications. Contractor shall not rely upon any communications from the District that is not from the District's Representative. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material or equipment suppliers shall be through the Contractor. In the case where a CM is hired for the Project, the CM shall be the main point of contact for communication of information. Copies should be sent to the Architect, District Representative and Inspector.

4.2.5 Payment Applications

The Architect will review and make recommendations to the District regarding the amounts due the Contractor on the Certificates for Payment pursuant to Article 9.3.4 and subject to the Inspector's review, (CM review, if applicable) and Architect's observation. This review of Payment Applications is sometimes called a "Pencil Draft." Return of a Pencil Draft shall constitute the District's dispute of the Payment Application that has been submitted. Contractor shall promptly respond to Pencil Drafts or Contractor's Payment Applications may be delayed. Contractor's failure to promptly respond to a Pencil Draft shall qualify as a delay in the Prompt Payment of a Request for Payment or Request for Retention.

4.2.6 Rejection of Work

In addition to the rights, duties, and obligations of the Inspector under this Article, the Architect may recommend to the District that the District reject Work which does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable to achieve the intent of the Contract Documents, the Architect (and/or CM) may recommend to the District that the District require additional inspection or testing of the Work in accordance with Article 13.5, whether or not such Work is Fabricated, installed, or completed. District may have Non-conforming Work removed and replaced pursuant to Article 9.7. However, neither this authority of the Architect (or CM) nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect (or CM) to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing portions of the Work.

Contractor shall, without charge, replace or correct Work found by the District to not be in conformance to Contract requirements. Contractor shall promptly segregate and remove rejected materials from the Project site.

This section is does not address a Notice of Non-Compliance and the remedies associated with a Notice of Non-Compliance which are addressed at Article 7.1.2

4.2.7 Warranties upon Completion

The Architect (and where applicable CM), in conjunction with the Inspector will conduct field reviews of the Work to determine the date of Substantial Completion and of Final Completion, shall receive and forward to the District for the District's review written warranties and related documents required by the Contract and assembled by the Contractor, and will issue a final Certificate for Payment when the Architect believes the Work has been completed in compliance with the requirements of the Contract Documents (See Article 9.11 for Close-Out). The handling by the Architect (or where applicable CM) of such warranties, maintenance manuals, or similar documents shall not diminish or transfer to the

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Architect any responsibilities or liabilities required by the Contract Documents of the Contractor or other entities, parties, or persons performing or supplying the Work.

On some Projects, the District will take a phased occupancy of the Project. In those cases, the District may commence the running of warranties on the buildings, or phases that are accepted after Punch List is completed and the District has accepted Completion of the separate phase. A separate Notice of Completion may be filed for the separate building or phase of work and warranties shall commence for the separate phase only to the extent that warranties do not require coordination or connection to other buildings or other parts of the site and only if the warranted item is completed to its entirety in the segregated building or phased area.

If written warranties are not provided at the time the Punch List is nearing completion, Architect (with recommendations from the CM and Inspector) shall determine the dollar value of the warranties and shall make recommendation for withholdings necessary to effectuate the transfer of such warranties to the District for future use as part of the Punch List for the Project pursuant to Article 9.6.

Warranties are not commenced through utilizing of equipment for testing and operation as necessary to acclimate buildings or where necessary to test systems.

4.2.8 Interpretation

The Architect will interpret and decide matters concerning performance and requirements of the Contract Documents. Architect shall make clarifications as necessary to interpret the Contract Documents.

4.3 PROJECT INSPECTOR

4.3.1 General

One or more Project Inspectors employed by the District and approved by the Division of the State Architect will be assigned to the Work in accordance with the requirements of Title 24 of the California Code of Regulations. The Inspector(s) duties are as specifically defined in Title 24 Section 4-333 and 4-342 and in DSA IR A-8.

4.3.2 Inspector's Duties and DSA Noted Timelines for Inspection

All Work shall be under the observation of the Inspector. Contractor shall establish a protocol for requesting inspection with Inspector so as to not delay the Work and provide adequate time for the Inspector to perform inspection. If such a protocol is not established ahead of time, Inspector may utilize the time criteria set by Title 24 of 48 hours in advance of submitting form DSA 156 for each new area. The Inspector shall have free access to any or all parts of the Work at any time. The Contractor shall furnish the Inspector such information as may be necessary to keep the Inspector fully informed regarding progress and manner of Work and character of materials. Such observations shall not, in any way, relieve the Contractor from responsibility for full compliance with all terms and conditions of the Contract, or be construed to lessen to any degree the Contractor's responsibility for providing efficient and capable superintendence. The Inspector is not authorized to make changes in the Drawings or Specifications nor shall the Inspector's approval of the Work and methods relieve the Contractor of responsibility for the correction of subsequently discovered defects, or from its obligation to comply with the Contract Documents.

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Inspector shall electronically post DSA required documents on the DSA electronic posting website. It is the Contractor's responsibility to determine the status of posting and determine if all the criteria for sign off of a category of Work on the Project Inspection Card (Form DSA 152) as defined more thoroughly in the most current version of the DSA 152 manual posted on the DSA website.

Inspector may collaborate with Contractor about approval of areas that may be constructed and approved incrementally under the DSA 152 card pursuant to the guidelines of PR-13 at Article 1.17. Inspector shall work with Contractor to present incremental approval proposals to DSA.

4.3.3 Inspector's Authority to Reject or Stop Work

The Inspector shall have the authority to reject Work whenever provisions of the Contract Documents are not being complied with, and Contractor shall instruct its Subcontractors and employees accordingly. In addition, the Inspector may stop any Work that poses a probable risk of harm to persons or property. The Contractor shall instruct its employees, Subcontractors, material and equipment suppliers, etc., accordingly. The absence of any Stop Work Order or rejection of any portion of the Work shall not relieve the Contractor from any of its obligations pursuant to the Contract Documents.

4.3.4 Inspector's Facilities

Within seven (7) days after the notice to proceed, the Contractor shall provide the Inspector with the temporary facilities as required. More specific requirements for the Inspector facilities may be further described under Division 1 of the Specifications.

4.3.5 Testing Times

The District will provide inspection and testing at its cost during the normal eight (8) hour day Monday through Friday (except holidays). Work by the Contractor outside of the normal eight (8) hour day shall constitute an authorization from the Contractor to the District to provide inspection and testing as required outside of the normal eight (8) hour day. Contractor shall provide adequate time for inspections so as to not delay the Work. An advanced timing protocol may be established pursuant to Article 4.3.2. If the Contractor is behind Schedule then it is incumbent on the Contractor to provide advance forecast through look ahead of the anticipated date for inspection so the Inspector may plan their activities so as to not delay the Project. Contractor shall reimburse District for any additional costs associated with inspection and testing (including re-inspection and re-testing) outside the normal eight-hour day and for any retests caused by the Contractor.

It is the Contractor's responsibility to request special inspections with sufficient time so all testing may be timely completed and posted so work may proceed and the Inspector's signature is attached to the Project Inspection Card (Form 152). Specifically, timely request for special inspection under the DSA Verified Report Forms 291 (laboratory), DSA Verified Report Form 292 (Special Inspection), and DSA Verified Report 293 (geotechnical) since DSA requirements under PR 13-01 specifically gives the Special Inspections 14 days to post to the DSA website. Failure to plan and pay (if applicable) for quicker delivery of Special Inspections may be counted as Float, but is not considered Governmental Delay Float under Article 8.1.4.

4.3.6 Special Inspections, Inspections or Tests Out of State, Out of Country or Remote from Project

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If Contractor has a Subcontractor or supplier that requires in plant or special inspections, inspections or tests that are out of the country, out of the state or a distance of more than 200 miles from the Project Site, the District shall provide the Special Inspector or individual performing tests time for inspection and testing during normal work hours. Contractor, however, is responsible for the cost of travel, housing, food, out of area premiums that may be in the Inspector/Testing Agreement with District, or other expenses necessary to ensure proper inspection, special inspection or testing is provided by a DSA Certified Inspector, Special Inspector, or individual performing tests. In some cases all three (DSA Inspector, Special Inspector, and Tester) may be required. In addition, if the DSA Certified Inspector, Special Inspector, or individual performing test has contractual travel clauses or special rates for out of town inspection, Contractor is responsible for all costs associated with the contractual travel costs in addition to all other costs. Arrangements for inspection and/or testing shall be made far enough in advance so as to not delay the Work.

4.4 STOP WORK ORDER

DSA may issue a Stop Work Order, or an Order to Comply, when either (1) the Work proceeds without DSA approval; (2) the Work proceeds without a DSA Inspector of Record, or (3) where DSA determines that the Work is not being performed in accordance with applicable rules and regulations, and would compromise the structural integrity of the Project or would endanger lives. If a Stop Work Order is issued, the Work in the affected area shall cease until DSA withdraws the Stop Work Order. Pursuant to Education Code section 17307.5(b), the District shall not be held liable in any action filed against the District for any delays caused by compliance with the Stop Work Order, except to the extent that an error or omission by the District is the basis for the issuance of the Stop Work Order.

Examples of Stop Work Orders that may be issued by DSA include DSA Bulletin 07-04 and Policy 10-01, the installation of automatic fire sprinkler systems without approved Plans, covering Work that has not been approved by Inspector on DSA Project Inspection Card (Form 152).

4.5 RESPONSIBILITY FOR ADDITIONAL CHARGES INCURRED BY THE DISTRICT FOR PROFESSIONAL SERVICES

If at any time prior to the completion of the requirements under the Contract Documents, the District is required to provide or secure additional professional services (including CM, Inspection, Architect, Engineering and Special Consultant Services) for any reason by any act of the Contractor, the District may seek a Deductive Change Order for any costs incurred for any such additional services, which costs shall be deducted from the next progress payment. A Deductive Change Order shall be independent from any other District remedies and shall not be considered a waiver of any District rights or remedies. If payments then or thereafter due to the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the District. Additional services shall include, but shall not be limited to, the following:

- a. Services made necessary by the default of the Contractor (Article 14 or Article 2.2).
- b. Services made necessary due to the defects or deficiencies in the Work of the Contractor (Article 2.2 and Article 9.6).
- c. Spurious or frivolous RFI's issued that do not conform to the requirements of Article 7.4. Issuance of the same RFI after receiving an answer from the Architect or Engineer

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- d. Review of Schedules that are provided by Contractor that do not Conform with the Requirements of Article 8.
- e. Preparation of a CCD or ICD to correct a Contractor Deficiency, or Contractor Caused Notice of Non-Compliance (See Article 7.3).
- f. Review of Incomplete Shop Drawings or Submittals, including the submission of Piecemeal Shop Drawings or Submittals unless piecemeal Submittals are specifically agreed upon by District (See Article 3.9)
- g. Services required by failure of the Contractor to perform according to any provision of the Contract Documents.
- h. Services in connection with evaluating substitutions of products, materials, equipment, Subcontractors' proposed by the Contractor, and making subsequent revisions to Drawings, Specifications, obtaining DSA approvals, DSA costs for review of CCD's, other governmental agency review costs, and providing other documentation required (except for the situation where the specified item is no longer manufactured or available). (See Article 3.10)
- i. Services for evaluating and processing Claims or Disputes submitted by the Contractor in connection with the Work outside the established Change Order process.
- j. Services required by the failure of the Contractor to prosecute the Work in a timely manner in compliance within the specified time of completion.
- k. Services in conjunction with the testing, adjusting, balancing and start-up of equipment other than the normal amount customarily associated for the type of Work involved.
- l. Services in conjunction with more than one (1) re-review of Submittals of Shop Drawings, Product Data, samples, RFI's etc.

4.6 DISPUTES AND CLAIMS

4.6.1 Decision of Architect

"Disputes" or "Claims" as defined in Article 4.6.9.1 between District and Contractor involving money or time, including those alleging an error or omission by the Architect shall be referred initially to the Architect for action as provided in Article 4.6.2 within ten (10) days after Contractor's Article 7 request for Change is denied. If there is a CM, the CM shall receive the Dispute and may review and also assemble opinions and documents to assist the Architect. A decision by the Architect, as provided in Article 4.6.5, shall be required as a condition precedent to proceeding with remedies set forth in Article 4.6.9 as to all such matters arising prior to the date Retention Payment Application is due, regardless of whether such matters relate to execution and progress of the Work, or the extent to which the Work has reached Final Completion.

The condition precedent of an Architect decision shall be waived if: (1) the position of Architect is vacant; (2) the Architect has failed to take action required under Article 4.6.5 within the time

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periods required therein; or (3) the Dispute or Claim relates to a stop notice claim not arising from any extra Change Order or Immediate Change Directive for which approval has not been provided.

4.6.2 Architect's Review

The Architect (and CM) will review the Dispute and take one or more of the following preliminary actions upon receipt of a Dispute: (1) request additional supporting data from the claimant; (2) submit a schedule to the parties indicating when the Architect expects to take action; (3) reject the Dispute in whole or in part, stating reasons for rejection; (4) recommend approval of the Dispute; or (5) suggest a compromise. The Architect may also, but is not obligated to, notify the Surety, if any, of the nature and amount of the Dispute.

4.6.2.1 *Architectural Immunity.* Architect review of Disputes and Claims shall be impartial and meant to resolve Disputes and Claims. Pursuant to the case, Huber, Hunt & Nichols, Inc. v. Moore (1977) 67 Cal.App.3d 278, the Architect is provided a quasi-judicial immunity for interpreting and deciding Disputes and Claims between the District and Contractor.

4.6.3 Documentation if Resolved

If a Dispute has been resolved, the Architect (and/or CM) will prepare a Change Order or obtain appropriate documentation to document the terms for Board approval.

4.6.4 Actions if Not Resolved

If a Dispute has not been resolved and all documentation requested pursuant to Article 4.6.2 has been provided, the Contractor shall, within ten (10) days after the Architect's initial response, assemble all the documents involved in the Dispute including copies of all back-up documentation of costs and the basis for the Dispute and take one or more of the following actions: (1) modify the initial Dispute; (2) notify the Architect that the initial Dispute stands; or (3) supplement with additional supporting data and re-submit to the Architect under Article 4.6.2.

4.6.5 Architect's Written Decision

If a Dispute has not been resolved after consideration of the foregoing and of other evidence presented by the parties or requested by the Architect, the Architect (or Architect through CM) shall provide a written decision twenty (20) days after compliance with Article 4.6.4. Upon expiration of such time period, the Architect (or Architect through CM) will render to the parties its written decision relative to the Dispute, including any change in the Contract Sum or Contract Time or both. The Architect may also request reasonable additional time to complete Architect's written decision.

If the resolution of the Dispute by the Architect is not satisfactory to the Contractor and copies of all back-up documentation of costs and the basis for the Dispute is fully articulated in a package of material that is complete, the Contractor may then submit a Claim to the District under Article 4.6.9.

4.6.6 Continuing Contract Performance

Pending final resolution of a Dispute or Claim, including, negotiation, mediation, arbitration, or litigation, the Contractor shall proceed diligently with performance of the Contract, and the District shall continue to make any undisputed payments in accordance with the Contract (less any

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withholdings or offsets). If the Claim is not resolved, Contractor agrees it will neither rescind the Contract nor stop the progress of the work, but Contractor's sole remedy shall be to submit such controversy to determination by a court of competent jurisdiction in the county where the Project is located, after the Project has been completed, and not before.

4.6.6.1 *District's Option to Submit Individual Disputes to Arbitration during Claims and Disputes Process.* At the District's sole option, in order to more efficiently resolve Claims during the Project and prior to the completion of the Claims Process, pursuant to Government Code section 9201, the District may submit individual Disputes or Claims for binding arbitration and Contractor agrees to the resolution of for each individual Dispute or Claim by an Arbitrator, including resolution of time and delays. If binding arbitration is utilized for individual Disputes or Claims, such resolution is full and final as to that particular Dispute or Claim. THIS INDIVIDUAL DISPUTE ARBITRATION PROCESS IS NOT AN ARBITRATION CLAUSE AND SHALL NOT BE CONSTRUED AS AN AGREEMENT TO ARBITRATE. THIS INDIVIDUAL DISPUTES ARBITRATION PROCESS IS FOR THE SOLE PURPOSE OF STREAMLINING AND RESOLVING DISPUTES OR CLAIMS DURING CONSTRUCTION AND SHALL BE REQUESTED ON SPECIFIC INDIVIDUAL ITEMS BY THE DISTRICT PRIOR TO RETENTION PAYMENT (EVEN IF THERE ARE DEDUCTIONS MADE FROM RETENTION PAYMENT) WHICH REPRESENTS THE FINAL COMPLETION OF THE PROJECT.

- a. If there is no Retention remaining on the Project, individual Disputes initiated prior to Project Final Completion shall continue until a final disposition of the Arbitration or resolution of the individual Claim or Dispute.
- b. No Tolling. The Arbitration process shall not toll the Disputes or Claims process under Article 4.6 or the requirement to submit Claims to Court under Article 4.6.9.5.

4.6.7 Claims for Concealed Trenches or Excavations Greater Than Four Feet Below the Surface

When any excavation or trenching extends greater than four feet below the surface or if any condition involving hazardous substances are encountered:

- a. Immediately upon discovery, The Contractor shall promptly, and before the following conditions are disturbed, notify the District, by telephone and in writing, of the condition except:
 1. If such condition is a hazardous waste condition, Contractor's bid includes removal or disposal of hazardous substances. Material that the Contractor believes may be a material that is hazardous waste, as defined in Section 25117 of the Health and Safety Code, is required to be removed to a Class I, Class II, or Class III disposal site in accordance with the provisions of existing law. In such case, the notice bulletin procedures of Article 7 apply.

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2. Subsurface or latent physical conditions at the Site differing from those indicated in the Drawings, Specifications, Soils Report, and from Contractor's own investigation under Article 2.1.
 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.
- b. The District shall investigate the conditions, and if District finds that the conditions do materially so differ, do involve hazardous waste, and cause a decrease or increase in the Contractor's cost of, or the time required for, performance of any part of the Work shall issue a Change Order or Construction Change Document under the procedures described in the Contract.
 - c. In the event that a dispute arises between the public entity or District and the Contractor whether the conditions materially differ, 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. The 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 contracting parties.

4.6.8 Dispute Concerning Extension of Time.

If Contractor and District cannot agree upon an extension of time, whether compensable or not, then Contractor must have first completed the procedures set forth in Article 8.4. Upon completion of the procedures set forth under Article 8.4, Contractor must then comply with the requirements in this Article including those set forth under Article 4.6.9.

4.6.9 Claims Procedures

Pursuant to the remedies under Public Contract Code section 9201 and Government Code section 930.2, Contractor, through execution of this Agreement, also agrees to comply with the Claims requirements of Article 4.6 to quickly and efficiently resolve Disputes and Claims. Further, to provide a level of accuracy to the records submitted, the District shall have the right to audit books and records pursuant to Article 13.11 based on the actual costs incurred and to reduce the uncertainty in resolving Disputes and Claims with limited information.

4.6.9.1 *Procedure Applicable to All Claims*

- a. Definition of Claim: A "Claim" is where a Dispute between the parties rises to the level where backup documentation is assembled and provided to the District as a separate demand by the Contractor for: (1) a time extension, including, without limitation, for relief from damages or penalties for delay assessed by the District under the Contract; (2) payment by the District of money or damages arising from Work done by, or on behalf of, the Contractor pursuant to the Contract and payment for which is not otherwise expressly provided for or to which the Contractor is not

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otherwise entitled to; or (3) an amount of payment disputed by the District. If the Claim is for damages associated with a DSA Stop Work Order, the Contractor shall not be entitled to a request for Compensation, but shall be entitled to utilize Governmental Delay Float (See Article 8.1.4.1.)

- b. Filing Claim Is Not Basis to Discontinue Work: The Contractor shall promptly comply with Work under the Contract or Work requested by 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 the performance of the Work covered by this Contract.
- c. Claim Notification: The Contractor shall within seven (7) calendar days after the written decision of the Architect, or if the time period for Architect's decision has passed under Article 4.6.5, submit a notification in writing sent by registered mail or certified mail with return receipt requested, with the District (and the District's CM) stating clearly the basis for the Claim and including all relevant and required documents. If the notification is not submitted within seven (7) days after the written decision of the Architect or the passage of time under Article 4.6.5, the Contractor shall be deemed to have waived all right to assert the Claim, and the Claim shall be denied. Claims submitted after the Retention Payment date shall also be considered null and void by the District. All Claims shall be reviewed pursuant to Articles 4.6.1 through 4.6.5.

The Formal Notification of Claim must be presented as follows:

- (1) The term "Claim" must be at the top of the page in no smaller than 20 point writing.
 - (2) All documentation submitted pursuant to Article 4.6 to the Architect shall be submitted with the "Claim."
 - (3) A stack of documents, copy of all Project documents, or the submission of random documents shall not constitute an adequate reference to supporting documentation.
 - (4) Any additional or supporting documentation that Contractor believes is relevant should be submitted at this time.
- d. Reasonable Documents to Support Claim: The Contractor shall furnish reasonable documentation to support the Claim. The Contractor shall provide all written detailed documentation which supports the Claim, including but not limited to: arguments, justifications, cost, estimates, Schedule analysis and detailed documentation. The format of the required reasonable documentation to support the Claim shall include, without limitation:
 - 1. Cover letter.

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2. Summary of factual basis of Claim and amount of Claim.
3. Summary of the basis of the Claim, including the specific clause and section under the Contract under which the Claim is made.
4. Documents relating to the Claim, including:
 - a. Specifications sections in question.
 - b. Relevant portions of the Drawings
 - c. Applicable Clarifications (RFI's)
 - d. Other relevant information, including responses that were received.
 - e. Contractor Analysis of Claim merit.
 - (a) Contractor's analysis of any Subcontractor vendor Claims that are being passed through.
 - (b) Any analysis performed by outside consultants
 - (c) Any legal analysis that Contractor deems relevant
 - f. Break down of all costs associated with the Claim.
 - g. For Claims relating to time extensions, an analysis and supporting documentation evidencing any effect upon the critical path in conformance with the requirements of Article 8.4 chronology of events and related correspondence.
 - h. Applicable Daily Reports and logs.
 - (a) If the Daily Reports or Logs are not available, lost or destroyed, there shall be a presumption that the lost documentation was unfavorable to the Contractor. See California Civil Jury Instruction 204.
 - i. For Claims involving overhead, cost escalation, acceleration, disruption or increased costs, a full version of job costs reports organized by category of work or Schedule of Values with budget information tracked against actual costs. Any and all supporting back-up data, including the original bid (and associated original unaltered metadata).
 - (a) The metadata and bid information shall be provided confidentially and subject to a protective order to prevent dissemination to other contractors or to the public. However, the bid documentation should remain intact and available for review and inspection in case of this type of increased cost Claim.
 - (b) This data on the bid shall be made available to any District attorneys or experts and shall also be utilized as evidence for any legal proceedings.
 - (c) If the bid documentation is not available, lost or destroyed, there shall be a presumption that the lost bid documentation was unfavorable to the

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Contractor. See California Civil Jury Instruction 204.

- e. Certification: The Contractor (and Subcontractors, if applicable) shall submit with the Claim a certification under penalty of perjury:
 - 1. That the Contractor has reviewed the Claim and that such Claim is made in good faith;
 - 2. Supporting data are accurate and complete to the best of the Contractor's knowledge and belief;
 - 3. The amount requested accurately reflects the amount of compensation for which the Contractor believes the District is liable.
 - 4. That the Contractor is familiar with Government Code sections 12650 et seq. and Penal Code section 72 and that false claims can lead to substantial fines and/or imprisonment.
- f. Signature of Certification: If the Contractor is not an individual, the certification shall be executed by an officer or general partner of the Contractor having overall responsibility for the conduct of the Contractor's affairs.
- g. Upon receipt of a Claim and all supporting documents as required above, the District shall conduct a reasonable review of the Claim and, within a period not to exceed 45 days, shall provide the Contractor a written statement identifying what portion of the Claim is disputed and what portion is undisputed. Upon receipt of a Claim, the District and Contractor may, by mutual agreement, extend the time period provided in this paragraph.
- h. If the District needs approval from its governing Board to provide the Contractor a written statement identifying the disputed portion and the undisputed portion of the Claim, and the governing Board does not meet within the 45 days or within the mutually agreed to extension of time following receipt of a Claim sent by registered mail or certified mail, return receipt requested, the District shall have up to three days following the next duly publicly noticed meeting of the governing Board after the 45-day period, or extension, expires to provide the Contractor a written statement identifying the disputed portion and the undisputed portion.
- i. Any payment due on an undisputed portion of the Claim shall be processed and made within 60 days after the District issues its written statement. If the District fails to issue a written statement, paragraph o below shall apply.

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- j. If the Contractor disputes the District's written response, or if the District fails to respond to a Claim issued pursuant to this Article 4.6.9 within the time prescribed, the Contractor may demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested, the District shall schedule a meet and confer conference within 30 days for settlement of the Claim.
- k. Within 10 business days following the conclusion of the meet and confer conference, if the Claim or any portion of the Claim remains in dispute, the District shall provide the Contractor a written statement identifying the portion of the Claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the Claim shall be processed and made within 60 days after the District issues its written statement. Any disputed portion of the Claim, as identified by the Contractor in writing, shall be submitted to nonbinding mediation, with the District and the Contractor sharing the associated costs equally. The District and Contractor shall mutually agree to a mediator within 10 business days after the disputed portion of the Claim has been identified in writing. If the parties cannot agree upon a mediator, each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the Claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator. If mediation is unsuccessful, the parts of the Claim remaining in dispute shall be subject to applicable procedures in Article 4.6.9.5.
- l. For purposes of this Article 4.6.9, mediation includes any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the parties in dispute resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes in this section.
- m. Unless otherwise agreed to by the District and the Contractor in writing, the mediation conducted pursuant to this Article 4.6.9 shall excuse any further obligation under Section 20104.4 to mediate after litigation has been commenced.
- n. This Claims process does not preclude the District from requiring arbitration of disputes under private arbitration or the Public Works Contract Arbitration Program, if mediation under this Article 4.6.9 does not resolve the parties' Claim. This Claims process does not preclude the District from submitting individual Disputes or Claims to binding arbitration pursuant to Article 4.6.9.4 below.
- o. Failure by the District to respond to a Claim from the Contractor within the time periods described in this subdivision or to otherwise meet the time requirements of this Article 4.6.9 shall result in the Claim being deemed

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rejected in its entirety. A Claim that is denied by reason of the District's failure to have responded to a Claim, or its failure to otherwise meet the time requirements of this Article 4.6.9, shall not constitute an adverse finding with regard to the merits of the Claim or the responsibility or qualifications of the Contractor.

- p. If a subcontractor or a lower tier subcontractor lacks legal standing to assert a Claim against a District because privity of contract does not exist, the Contractor may present to the District a Claim on behalf of a subcontractor or lower tier subcontractor. A subcontractor may request in writing, either on his or her own behalf or on behalf of a lower tier subcontractor, that the Contractor present a Claim for work which was performed by the subcontractor or by a lower tier subcontractor on behalf of the subcontractor. The subcontractor requesting that the Claim be presented to the District shall furnish reasonable documentation to support the Claim. Within 45 days of receipt of this written request, the Contractor shall notify the subcontractor in writing as to whether the Contractor presented the Claim to the District and, if the Contractor did not present the Claim, provide the subcontractor with a statement of the reasons for not having done so.
- q. Upon receipt of a Claim, the parties may mutually agree to waive, in writing, mediation and proceed directly to the commencement of a civil action or binding arbitration, as applicable.
- r. The Contractor's Claim shall be denied if it fails to follow the requirements of this Article.

4.6.9.2 *District (through CM or District's Agent or Attorney) May Request Additional Information.* Within thirty (30) days of receipt of the Claim and the information under this Article, the District may request in writing any additional documentation supporting the Claim or documentation relating to defenses to the Claim which the District may assert. If additional documents are required, the time in which the Claim is evaluated may be extended by a reasonable time so the Claim and additional documents may be reviewed.

4.6.9.3 *Claims Procedures in Addition to Government Code Claim.* Nothing in the Claims procedures set forth in this Article 4 of the General Conditions shall act to waive or relieve the Contractor from meeting the requirements set forth in Government Code section 900 et seq.

4.6.9.4 *Binding Arbitration of Individual Claim Issues.* To expedite resolution of Claims pursuant to Public Contract Code section 9201, at the District's sole option, the District may submit individual Claims to Arbitration prior to Retention Payment consistent with the requirements of Article 4.6.6.1.

4.6.9.5 *Resolution of Claims in Court of Competent Jurisdiction.* If Claims are not resolved under the procedure set forth and pursuant to Article 4.6.9, such Claim or controversy shall be submitted to a court in the County of the location of the Project after the Project has been completed, and not before.

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4.6.9.6 *Warranties, Guarantees and Obligations.* The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto, and, in particular but without limitation, the warranties, guarantees and obligations imposed upon Contractor by the General Conditions and amendments thereto; and all of the rights and remedies available to District and Architect thereunder, are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by laws or regulations by special warranty or guarantee or by other provisions of the Contract Documents, and the provisions of this Article will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right and remedy to which they apply.

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ARTICLE 5 SUBCONTRACTORS

5.1 DEFINITIONS

5.1.1 Subcontractual Relations Bound to Same Contract Terms at General Contractor

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the same obligations and responsibilities, assumed by Contractor pursuant to the Contract Documents. Each subcontract agreement shall preserve and protect the rights of the District and the Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound. Upon written request of the Subcontractor, the Contractor shall identify to the Subcontractor the terms and conditions of the proposed subcontract agreement, which may be at variance with the Contract Documents. Subcontractors shall similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

5.1.2 Subcontractor Licenses and DIR Registration

All Subcontractors shall be properly licensed by the California State Licensing Board. All Subcontractors (of any tier) performing any portion of the Work must comply with the Labor Code sections 1725.5 and 1771.1 and must be properly and currently registered with the California Department of Industrial Relations and qualified to perform public works pursuant to Labor Code section 1725.5 throughout the duration of the Project. No portion of the Work is permitted to be performed by a Subcontractor of any tier unless the subcontractor is properly registered with DIR. Any Subcontractors of any tier not properly registered with DIR shall be substituted in accordance with Labor Code section 1771.1.

5.1.3 Substitution of Subcontractor

Substitution of Subcontractors shall be permitted only as authorized under Public Contract Code §§ 4107 et seq. Any substitutions of Subcontractors shall not result in any increase in the Contract Price or result in the granting of any extension of time for the completion of the Project.

5.1.4 Contingent Assignment of Subcontracts and Other Contracts

Each subcontract, purchase order, vendor contract or agreement for any portion of the Work is hereby assigned by the Contractor to the District provided that:

- a. Such assignment is effective only after Termination of this Contract with the Contractor by the District as provided under Article 14 and only for those subcontracts and other contracts and agreements that the District accepts by notifying the Subcontractor or Materialman (as may be applicable) in writing; and

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- b. Such assignment is subject to the prior rights of the Surety(ies) obligated under the Payment Bond and Performance Bond.
- c. The Contractor shall include adequate provisions for this contingent assignment of subcontracts and other contracts and agreements in each such document.

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ARTICLE 6 CONSTRUCTION BY DISTRICT OR BY SEPARATE CONTRACTORS

6.1 DISTRICT'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

6.1.1 Separate Contracts.

6.1.1.1 District reserves the right to let other contracts in connection with this Work. Contractor shall afford other contractors reasonable opportunity for (1) introduction and storage of their materials; (2) access to the Work; and (3) execution of their work. Contractor shall properly connect and coordinate its work with that of other Contractors.

6.1.1.2 If any part of Contractor's Work depends on proper execution or results of any other contractor, the Contractor shall inspect and within seven (7) days or less, report to Architect, in writing, any defects in such work that render it unsuitable for proper execution of Contractor's Work. Contractor will be held accountable for damages to District for that Work which it failed to inspect or should have inspected. Contractor's failure to inspect and report shall constitute its acceptance of other contractors' Work as fit and proper for reception of its Work, except as to defects which may develop in other contractors' work after execution of Contractor's work.

6.1.1.3 To ensure proper execution of its subsequent Work, Contractor shall measure and inspect Work already in place and shall at once report to the Architect in writing any discrepancy between executed Work as built and the Contract Documents.

6.1.1.4 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 District in prosecution of the Project and the potential impact of such Work on the Baseline Schedule or Schedule updates.

6.1.1.5 Nothing herein contained shall be interpreted as granting to Contractor the exclusive occupancy at the site of Project. Contractor shall not cause any unnecessary hindrance or delay to any other contractor working on the Project Site. If execution of any contract by the District is likely to cause interference with Contractor's performance of this Contract, once Contractor provides District timely written notice and identifies the Schedule Conflict, District 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.

6.1.1.6 District shall not be responsible for any damages suffered or extra costs incurred by Contractor resulting directly or indirectly from award or performance or attempted performance of any other contract or contracts at the Project necessary for the performance of the Project (examples include Electrical Utility Contractor, separate offsite contractor, a separate grading contractor, furniture installation etc.)

CONTRACTOR IS AWARE THAT THIS CONTRACT MAY BE SPLIT INTO SEVERAL PHASES BASED ON DOCUMENTATION PROVIDED WITH THIS BID OR DISCUSSED AT THE JOB WALK. CONTRACTOR HAS MADE ALLOWANCE FOR ANY DELAYS OR DAMAGES WHICH MAY ARISE FROM COORDINATION WITH CONTRACTORS REQUIRED FOR OTHER PHASES.

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IF ANY DELAYS SHOULD ARISE FROM ANOTHER CONTRACTOR WORKING ON A DIFFERENT PHASE, CONTRACTOR'S SOLE REMEDY FOR DAMAGES, INCLUDING DELAY DAMAGES, SHALL BE AGAINST THE CONTRACTOR WHO CAUSED SUCH DAMAGE AND NOT THE DISTRICT. CONTRACTOR SHALL PROVIDE ACCESS TO OTHER CONTRACTORS FOR OTHER PHASES AS NECESSARY TO PREVENT DELAYS AND DAMAGES TO OTHER CONTRACTORS WORKING ON OTHER PHASES OF CONSTRUCTION.

6.1.2 District's Right to Carry Out the Work

(See Article 2.2)

6.1.3 Designation as Contractor

When separate contracts are awarded to contractors on the Project Site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate District/Contractor Agreement.

6.1.4 District Notice to the Contractor of Other Contractors

The Contractor shall have overall responsibility to reasonably coordinate and schedule Contractor's activities with the activities of the District's forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the District in reviewing their construction schedules when:

- a. Notice is provided in the Contract Documents of other scope of Work,
- b. In the case where there is known Work to be performed by other Contractors
- c. For outside contractors hired by utilities
- d. Where the Contract Document provides "Work by Others" or "By Others"
- e. Where specifically noted during the Pre-Bid Conference
- f. Where specifically noted in the Mandatory Job Walk
- g. By CO or ICD,
- h. With respect to the installation of :
 - 1. Furniture,
 - 2. Electronics and networking equipment,
 - 3. Cabling,
 - 4. Low voltage,
 - 5. Off-site work,
 - 6. Grading (when by a separate contractor),

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7. Environmental remediation when excluded by the Contract Documents (i.e. asbestos, lead or other hazardous waste removal)
8. Deep cleaning crews,
9. Commissioning and testing,
10. Keying and re-keying,
11. Programming

6.1.4.1 Exception where no Coordination is Required on the Part of the Contractor for Turn Key Operations. If the Contractor has specifically outlined a “Turn Key” or “Complete Delivery” of a final completed operational school in writing as part of the Baseline Schedule..

6.1.4.2 The Contractor shall make any revisions to the Baseline Schedule (or Schedule Update) and Contract Sum deemed necessary after a joint review and mutual agreement. The Baseline Schedule (or Schedule Update) shall then constitute the Schedules to be used by the Contractor, separate contractors, and the District until subsequently revised. Additionally, Contractor shall coordinate with Architect, District, and Inspector to ensure timely and proper progress of Work.

6.2 CONSTRUCTIVE OWNERSHIP OF PROJECT SITE AND MATERIAL

Upon commencement of Work, the Contractor becomes the constructive owner of the entire site, improvements, material and equipment on Project site. Contractor must ensure proper safety and storage of all materials and assumes responsibility as if Contractor was the owner of the Project site. All risk of loss or damage shall be borne by Contractor during the Work until the date of Completion. As constructive owner of the Project site, Contractor must carry adequate insurance in case of calamity and is not entitled to rely on the insurance requirements as set forth in this Agreement as being adequate coverage in case of calamity.

6.3 DISTRICT’S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors, and the District as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish as described in Article 3.12, the District may clean up and allocate the cost among those it deems responsible.

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ARTICLE 7 CHANGES IN THE WORK

7.1 CHANGES

7.1.1 No Changes Without Authorization

There shall be no change whatsoever in the Drawings, Specifications, or in the Work without an executed Change Order, Change Order Request, Immediate Change Directive, or order by the Architect for a minor change in the Work as herein provided. District shall not be liable for the cost of any extra work or any substitutions, changes, additions, omissions, or deviations from the Drawings and Specifications unless the District's Governing Board or designated representative with delegated authority (subject to Board ratification) has authorized the same and the cost thereof approved in writing by Change Order or executed Construction Change Document. No extension of time for performance of the Work shall be allowed hereunder unless claim for such extension is made at the time changes in the Work are ordered, and such time duly adjusted in writing in the Change Order. The provisions of the Contract Documents shall apply to all such changes, additions, and omissions with the same effect as if originally embodied in the Drawings and Specifications. Notwithstanding anything to the contrary in this Article 7, all Change Orders shall be prepared and issued by the Architect and shall become effective when executed by the District's Governing Board, the Architect, and the Contractor.

Should any Change Order result in an increase in the Contract Price, the cost of such Change Order shall be agreed to, in writing, in advance by Contractor and District and be subject to the monetary limitations set forth in Public Contract Code section 20118.4 (Please check with the District since there are different interpretations of the limitations of Public Contract Code section 20118.4 depending on the County the Project is located). In the event that Contractor proceeds with any change in Work without first notifying District and obtaining the Architect's and District's consent to a Change Order, Contractor waives any Claim of additional compensation for such additional work and Contractor takes the risk that a Notice of Non-Compliance may issue, a critical path Project delay may occur, and the Contractor will also be responsible for the cost of preparation and DSA CCD review fees for a corrective DSA approved Construction Change Document.

CONTRACTOR UNDERSTANDS, ACKNOWLEDGES, AND AGREES THAT THE REASON FOR THIS NOTICE REQUIREMENT IS SO THAT DISTRICT MAY HAVE AN OPPORTUNITY TO ANALYZE THE WORK AND DECIDE WHETHER THE DISTRICT SHALL PROCEED WITH THE CHANGE ORDER OR ALTER THE PROJECT SO THAT SUCH CHANGE IN WORK BECOMES UNNECESSARY AND TO AVOID THE POSSIBLE DELAYS ASSOCIATED WITH THE ISSUANCE OF A NOTICE OF NON-COMPLIANCE.

7.1.2 Notices of Non-Compliance

Contractor deviation or changes from approved Plans and Specifications may result in the issuance of a Notice of Non-Compliance (See DSA Form 154). Contractor is specifically notified that deviations from the Plans and Specifications, whether major or minor, may result in the requirement to obtain a DSA Construction Change Document to correct the Notice of Non-Compliance. (See Article 7.3.1 for Definition of CCD). In some cases, the lack of a DSA approved CCD AND verification from the Inspector that a Notice of Non-Compliance has been corrected may result in a critical path delay to the next

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stage of Work on the Project. Specifically, a deviation from approved Plans and Specifications may prevent approval of the category of Work listed in the DSA 152 Project Inspection Card. Any delays that are caused by the Contractor's deviation from approved Plans and Specifications shall be the Contractor's responsibility.

7.1.3 Architect Authority

The Architect will have authority to order minor changes in the Work that do not involve DSA Approval not involving any adjustment in the Contract Sum, or an extension of the Contract Time.

7.2 CHANGE ORDERS ("CO")

A CO is a written instrument prepared by the Architect and signed by the District (as authorized by the District's Governing Board), the Contractor, and the Architect stating their agreement upon all of the following:

- a. A description of a change in the Work;
- b. The amount of the adjustment in the Contract Sum, if any; and
- c. The extent of the adjustment in the Contract Time, if any.

A CO may be comprised of ICD's, Response to RFP's and COR's

7.3 CONSTRUCTION CHANGE DOCUMENT (CCD Category A, and CCD Category B) and IMMEDIATE CHANGE DIRECTIVE (ICD)

7.3.1 Definitions

7.3.1.1 *Construction Change Document (CCD)*. A Construction Change Document is a DSA term that is utilized to address changes to the DSA approved Plans and Specifications. There are two types of Construction Change Documents. (1) DSA approved CCD Category A for Work affecting structural, access compliance or fire/ life safety of the Project which will require a DSA approval; and, (2) CCD Category B for Work NOT affecting structural safety, access compliance or fire/ life safety that will not require a DSA approval (except to confirm that no approval is required). Both CCD Category A and Category B shall be set forth in DSA Form 140 and submitted to DSA as required. A CCD requires signature approval by the A/E of record, DSA, structural engineer and delegated professional engineer when applicable.

7.3.1.2 *Immediate Change Directive (ICD)*. An Immediate Change Directive is a written order to the Contractor prepared by the Architect and signed by the District (and CM if there is a CM on the Project) and the Architect, directing a change in the Work and stating a proposed basis for adjustment, if any, in the Contract Sum or Contract Time, or both. The District may by ICD, without invalidating the Contract, direct immediate changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions within. If applicable, the Contract Sum and Contract Time will be adjusted accordingly.

In the case of an Immediate Change Directive being issued, Contractor must commence Work immediately or delays from failure to perform the ICD shall be the responsibility of

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Contractor and the failure to move forward with Work immediately shall also be grounds for Termination under Article 14.

An ICD does not automatically trigger an Article 7.6 Dispute or Claim. Contractor must timely follow the procedures outlined at Article 7.6 and 4.6 where applicable.

Refer to Division 1 and Supplementary General Conditions for a copy of the proposed Immediate Change Directive form.

7.3.2 Use to Direct Change

An ICD shall be used to move work forward immediately and to avoid delay. In some cases, an ICD shall be issued in the absence of agreement on the terms of a CO, COR, or RFP. A copy of an ICD form is provided in the Supplementary General Conditions and Division 1. The anticipated not to exceed price for the Work will be inserted into the ICD. In the case of an ICD issued to correct Contractor Deficiencies or to correct a Contractor caused Notice of Non-Compliance, the ICD may be issued with \$0 and no additional time. Contract may prepare a COR associated with the ICD pursuant to Article 7. However, Contractor shall proceed with all Work required under an Approved ICD immediately upon issuance. Failure to proceed with the Work under an ICD shall be grounds for Termination for Cause under Article 14 or take over the Work under Article 2.2.

If adequate time exists, an ICD may be subject of an RFP for pricing and determination if any time that may be required. However, if an RFP is not completed, Contractor shall immediately commence Work when an ICD is issued. If the RFP is incomplete, it may still be completed to be submitted for pricing purposes as long as the RFP is submitted within the timeline provided by the RFP, or within 10 days following issuance of the ICD.

7.3.3 ICD Issued Over a Notice of Non-Compliance or to Cover Work Subject to a DSA 152 Sign Off

In some cases, an ICD shall be for the purpose of proceeding with Work to keep the Project on Schedule and as an acknowledgement by the District that Contractor is proceeding with Work contrary to a Notice of Non-Compliance, prior to issuance of a DSA approved CCD Category A, or to direct the covering of Work which has not yet received a DSA 152 Inspection Approval to move forward.

7.3.3.1 *Contractor Compliance with all Aspects of an ICD.* Contractor is to undertake the ICD and comply with all aspects of the Work outlined in the ICD. Inspector is to inspect the Work pursuant to the ICD. Failure to follow the ICD may result in deduction of the ICD Work under Article 2.2 or Termination of the Contractor pursuant to Article 14.

7.3.3.2 *Exception in the Case of DSA Issued Stop Work Order.* Contractor must proceed with an ICD even if a CCD has not been approved by DSA except in the case of a DSA issued Stop Work Order. If a DSA Stop Work Order is issued, Contractor must stop work and wait further direction from the District.

7.3.3.3 *ICD Due to Contractor Deficiency or Contractor Caused Notice of Non-Compliance.* If an ICD is issued to correct a Contractor Deficiency or a Contractor caused notice of Non-Compliance, Contractor specifically acknowledges responsibility for all consequential damages associated

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with the Contractor Deficiency or Contractor caused Notice of Non-Compliance and all consequential damages and costs incurred to correct the deficiency under Article 4.5

7.4 REQUEST FOR INFORMATION (“RFI”)

7.4.1 Definition

A RFI is a written request prepared by the Contractor requesting the Architect to provide additional information necessary to clarify or amplify an item which the Contractor believes is not clearly shown or called for in the Drawings or Specifications, or to address problems which have arisen under field conditions.

7.4.1.1 A RFI shall not be used as a vehicle to generate time extensions.

7.4.1.2 Resubmission of the same or similar RFI is not acceptable. RFI’s that are similar should be addressed in Project meetings where the requestor (Contractor, Subcontractor or vendor) is able to address the particular issue with the Architect or Engineer and a resolution addressed in the minutes.

7.4.1.3 A RFI response applicable to a specific area cannot be extended to other situations unless specifically addressed in writing within the RFI or in a separate RFI.

7.4.1.4 RFI’s should provide a proposed solution and should adequately describe the problem that has arisen.

7.4.2 Scope

The RFI shall reference all the applicable Contract Documents including Specification section, detail, page numbers, Drawing numbers, and sheet numbers, etc. The Contractor shall make suggestions and interpretations of the issue raised by the RFI. An RFI cannot modify the Contract Cost, Contract Time, or the Contract Documents.

7.4.3 Response Time

The Architect must respond to a RFI within a reasonable time after receiving such request. If the Architect’s response results in a change in the Work, then such change shall be effected by a written CO, COR RFP or ICD, if appropriate. If the Architect cannot respond to the RFI within a reasonable time, the Architect shall notify the Contractor, with a copy to the Inspector and the District, of the amount of time that will be required to respond.

7.4.4 Costs Incurred

The Contractor shall be responsible for any costs incurred for professional services as more fully set forth in Article 4.5, which shall be subject to a Deductive Change Order, if an RFI requests an interpretation or decision of a matter where the information sought is equally available to the party making such request. District, at its sole discretion, shall issue a Deductive Change Order to Contractor for all such professional services arising from this Article.

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7.5 REQUEST FOR PROPOSAL ("RFP")

7.5.1 Definition

A RFP is a written request prepared by the Architect (and/or CM) requesting the Contractor to submit to the District and the Architect an estimate of the effect of a proposed change on the Contract Price and (if applicable) the Contract Time. If Architect issues a Bulletin, the Changed items in the Bulletin shall be addressed as an RFP and all responses shall be prepared to a Bulletin as addressed in this Article 7.5. A form RFP is included in the Division 1 documents.

7.5.2 Scope

A RFP shall contain adequate information, including any necessary Drawings and Specifications, to enable Contractor to provide the cost breakdowns required by Article 7.7. The Contractor shall not be entitled to any Additional Compensation for preparing a response to an RFP, whether ultimately accepted or not.

7.5.3 Response Time

Contractor shall respond to an RFP within ten (10) days or the time period otherwise set forth in the RFP.

7.6 CHANGE ORDER REQUEST ("COR")

7.6.1 Definition

A COR is a written request prepared by the Contractor supported by backup documentation requesting that the District and the Architect issue a CO based upon a proposed change, cost, time, or cost and time that may be incurred on the Project or arising from an RFP, ICD, or CCD.

7.6.2 Changes in Price

A COR shall include breakdowns per Article 7.7 to validate any change in Contract Price due to proposed change or Claim.

7.6.3 Changes in Time

A COR shall also include any additional time required to complete the Project only if the delay is a critical path delay. Any additional time requested shall not be the number of days to make the proposed change, but must be based upon the impact to the Project Schedule as defined in Article 8. A schedule fragnet showing the time delay must be submitted with the COR. Any changes in time will be granted only if there is an impact to the critical path. If Contractor fails to request a time extension in a COR, then the Contractor is thereafter precluded from requesting or claiming a delay.

7.7 COST OF CHANGE ORDERS

7.7.1 Scope

Within ten (10) days after a request is made for a change that impacts the Contract Sum as defined in Article 9.1, the critical path, or the Contract Time as defined in Article 8.1.1, the Contractor shall

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provide the District and the Architect, with a written estimate of the effect of the proposed CO upon the Contract Sum and the actual cost of construction, which shall include a complete itemized cost breakdown of all labor and material showing actual quantities, hours, unit prices, and wage rates required for the change, and the effect upon the Contract Time of such CO. Changes may be made by District by an appropriate written CO, or, at the District's option, such changes shall be implemented immediately upon the Contractor's receipt of an appropriate written Construction Change Document.

District may, as provided by law and without affecting the validity of this Agreement, order changes, modification, deletions and extra work by issuance of written CO or CCD from time to time during the progress of the Project, Contract Sum being adjusted accordingly. All such Work shall be executed under conditions of the original Agreement except that any extension of time caused thereby shall be adjusted at time of ordering such change. District has discretion to order changes on a "time and material" basis with adjustments to time made after Contractor has justified through documentation the impact on the critical path of the Project.

7.7.1.1 *Time and Material Charges.* If the District orders Work on a "time and material" basis, timesheets shall be signed daily by the Inspector or District Representative at or near the time the Work is actually undertaken and shall show the hours worked, and the Work actually completed. No time sheets shall be signed the next day. A copy shall be provided to the Person signing the document at the time the document is signed, but not before 10 am the following day.

7.7.2 Determination of Cost

The amount of the increase or decrease in the Contract Price from a CO or COR, if any, shall be determined in one or more of the following ways as applicable to a specific situation:

- a. Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation. If an agreement cannot be reached within fifteen (15) days after submission and negotiation of Contractor's proposal, Contractor may submit pursuant to Article 7.7.3. Submission of sums which have no basis in fact are at the sole risk of Contractor and may be a violation of the False Claims Act set forth under Government Code section 12650 et seq.);
 1. If the District objects to 7.7.2(a) as a method for submission due to inaccuracies in the submitted amount, overstatement of manpower or time required to perform the CO, or unreliability of the data provided, the District may either have the Architect or a professional estimator determine the cost for the CO, and the applicable time extension, or the Contractor shall utilize Article 7.7.2(d) or 7.7.3.
 2. Once the District provides a written objection to use of Article 7.7.2(a) due to unreliability of the estimated price, the Contractor shall no longer utilize mutual acceptance of a lump sum as a method for submission of CO's and shall provide a breakdown of estimated or actual costs pursuant to Article 7.7.2(d) or 7.7.3
- b. By unit prices contained in Contractor's original bid and incorporated in the Project documents or fixed by subsequent agreement between District and Contractor;

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- c. Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee. However, in the case of disagreement, Contractor must utilize the procedure under Article 7.7.3; or
- d. By cost of material and labor and percentage of overhead and profit. If the value is determined by this method the following requirements shall apply:

1. *Basis for Establishing Costs*

- (1) Labor will be the cost for wages prevailing locally for each craft or type of workers at the time the extra Work is done, plus employer payments of payroll taxes and workers compensation insurance (exclude insurance costs as part of the overhead and profit mark-up), health and welfare, pension, vacation, apprenticeship funds, and other direct costs resulting from Federal, State, or local laws, as well as assessments or benefits required by lawful collective bargaining agreements. In no case shall the total labor costs exceed the applicable prevailing wage rate for that particular classification. 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.
- (2) Materials shall be at invoice or lowest current price at which such materials are locally available and delivered to the Site in the quantities involved, plus sales tax, freight, and delivery. The District reserves the right to approve materials and sources of supply or to supply materials to the Contractor if necessary for the progress of the Work. No markup shall be applied to any material provided by the District.
- (3) Tool and Equipment Rental. No payment will be made for the use of tools which have a replacement value of \$250 or less.

Regardless of ownership, the rates to be used in determining equipment rental costs shall not exceed listed rates prevailing locally at equipment rental agencies or distributors at the time the Work is performed. Rates applied shall be appropriate based on actual equipment need and usage. Monthly, weekly or other extended use rates that results in the lowest cost shall be applied if equipment is used on site for extended periods.

The rental rates paid shall include the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, and all incidentals.

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Necessary loading and transportation costs for equipment used on the extra Work shall be included. If equipment is used intermittently and, when not in use, could be returned to its rental source at less expense to the District than holding it at the Work Site, it shall be returned unless the Contractor elects to keep it at the Work Site at no expense to the District.

All equipment shall be acceptable to the Inspector, in good working condition, and suitable for the purpose for which it is to be used. Manufacturer's ratings and modifications shall be used to classify equipment, and equipment shall be powered by a unit of at least the minimum rating recommended by the manufacturer.

If tool and equipment charges are part of a Dispute or Claim, the District reserves the right to utilize actual costs for tools and equipment or a depreciation rate for equipment based on audit finding under Article 13.11 and deduct any rental charges that exceed actual or depreciated costs.

- e. Other Items. The District may authorize other items which may be required on the extra work. Such items include labor, services, material, and equipment which are different in their nature from those required by the Work, and which are of a type not ordinarily available from the Contractor or any of the Subcontractors. Invoices covering all such items in detail shall be submitted with the request for payment.
- f. Invoices. Vendors' invoices for material, equipment rental, and other expenditures shall be submitted with the COR. If the request for payment is not substantiated by invoices or other documentation, the District may establish the cost of the item involved at the lowest price which was current at the time of the Daily Report.
- g. Overhead. Overhead, including direct and indirect costs, shall be submitted with the COR and include: field overhead, home office overhead, off-site supervision, CO preparation/negotiation/research, time delays, Project interference and disruption, additional guaranty and warranty durations, on-site supervision, additional temporary protection, additional temporary utilities, additional material handling costs, liability and property damage insurance, and additional safety equipment costs.

7.7.3 Format for COR or CO's

The following format shall be used as applicable by the District and the Contractor to communicate proposed additions to the Contract. All costs submitted shall be actual costs and labor shall be unburdened labor. Refer to Division 1 for a copy of the Construction Change Order form.

| | <u>EXTRA</u> | <u>CREDIT</u> |
|--|--------------|---------------|
| (a) Material (attach itemized quantity and unit cost plus sales tax) | _____ | _____ |

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| | | <u>EXTRA</u> | <u>CREDIT</u> |
|-----|---|--------------|---------------|
| (b) | Labor Not to Exceed Applicable Prevailing Wage Rates (attach itemized hours and rates) | | |
| (c) | Equipment (attach invoices) | | |
| (d) | Subtotal | | |
| (e) | If Subcontractor performed work, add Subcontractor's overhead and profit to portions performed by Subcontractor, not to exceed 10% of item (d). | | |
| (f) | Subtotal | | |
| (g) | Contractor's Overhead and Profit: Not to exceed 10% of Item (d) if Contractor performed the work. No more than 5% of Item (d) if Subcontractor performed the work. If work was performed by Contractor and Subcontractors, portions performed by Contractor shall not exceed 10% of Item (d), and portions performed by Subcontractor shall not exceed 10% of Item (d). | | |
| (h) | Subtotal | | |
| (i) | Bond not to exceed one percent (1%) of Item (h) | | |
| (k) | TOTAL | | |
| (l) | Time/ Days | | |

The undersigned Contractor approves the foregoing Change Order or Immediate Change Directive as to the changes, if any, and the Contract price specified for each item and as to the extension of time allowed, if any, for completion of the entire Work on account of said Change Order or Immediate Change Directive, and agrees to furnish all labor, materials and service and perform all Work necessary to complete any additional Work specified therein, for the consideration stated herein. It is understood that said Change Order or Immediate Change Directive shall be effective when approved by the Governing Board of the District.

It is expressly understood that the value of such extra Work or changes, as determined by any of the aforementioned methods, expressly includes any and all of the Contractor's costs and expenses, both direct and indirect, resulting from additional time required on the Project or resulting from delay to the Project. Any costs, expenses, damages or time extensions not included are deemed waived.

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The Contractor expressly acknowledges and agrees that any change in the Work performed shall not be deemed to constitute a delay or other basis for claiming additional compensation based on theories including, but not limited to, acceleration, suspension or disruption to the Project.

7.7.3.1 *Adjustment for Time and Compensable Delay.* A CO shall also include any additional time required to complete the Project. Any additional time requested shall not be the number of days to make the proposed change, but must be based upon the impact to the Project Schedule as defined in Article 8 of the General Contract. A schedule fragnet showing the time delay must be submitted with the CO. Any changes in time will be granted only if there is an impact to the critical path. If Contractor fails to request a time extension in a CO, then the Contractor is thereafter precluded from requesting or claiming a delay.

7.7.4 Deductive Change Orders

All Deductive Change Order(s) must be prepared utilizing the form under Article 7.7.3 (a) – (d) only, setting forth the actual costs incurred. Except in the case of an Article 2.2 or 9.6 Deductive Change Order where no mark-up shall be allowed, Contractor will be allowed a maximum of 5% total profit and overhead.

For unilateral Deductive Change Orders, or where credits are due from Contractor for Allowances, Deductive Items, Inspection, Damage, DSA CCD review costs, Architect or Inspector costs for after hours or corrective services, Work removed from the Agreement under Article 2.2 or Article 9.6, there shall be no mark-up.

District may, any time after a Deductive Change Order is presented to Contractor by District for items under Article 2.2 or Article 9.6 or if there is disagreement as to the Deductive Change Order, issue a unilateral Deductive Change Order on the Project and deduct the Deductive Change Order from a Progress Payment, Final Payment, or Retention.

7.7.5 Discounts, Rebates, and Refunds

For purposes of determining the cost, if any, of any change, addition, or omission to the Work hereunder, all trade discounts, rebates, refunds, and all returns from the sale of surplus materials and equipment shall accrue and be credited to the Contractor, and the Contractor shall make provisions so that such discounts, rebates, refunds, and returns may be secured, and the amount thereof shall be allowed as a reduction of the Contractor's cost in determining the actual cost of construction for purposes of any change, addition, or omissions in the Work as provided herein. All CO's are subject to Audit under Article 13.11 for discounts, rebates and refunds.

7.7.6 Accounting Records

With respect to portions of the Work performed by CO's and CCD's on a time-and-materials, unit-cost, or similar basis, the Contractor shall keep and maintain cost-accounting records in a format consistent with accepted accounting standards and satisfactory to the District, which shall be available to the District on the same terms as any other books and records the Contractor is required to maintain under the Contract Documents.

Any time and material charges shall require Inspector's signature on time and material cards showing the hours worked and the Work actually completed. (See Article 7.7.1.1)

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7.7.7 Notice Required

If the Contractor desires to initiate a Dispute or Claim for an increase in the Contract Price, or any extension in the Contract Time for completion, Contractor shall notify the applicable party responsible for addressing the Dispute or Claim pursuant to Article 4.6. No Claim or Dispute shall be considered unless made in accordance with this subparagraph. Contractor shall proceed to execute the Work even though the adjustment may not have been agreed upon. Any change in the Contract Price or extension of the Contract Time resulting from such Claim shall be authorized by a CO.

7.7.8 Applicability to Subcontractors

Any requirements under this Article 7 shall be equally applicable to CO's, COR's or ICD's issued to Subcontractors by the Contractor to the same extent required by the Contractor.

7.7.9 Alteration to Change Order Language

Contractor shall not alter or reserve time in COR's, CO's or ICD's. Contractor shall execute finalized CO's and proceed under Article 7.7.7 and Article 4.6 with proper notice. If Contractor intends to reserve time without an approved CPM schedule prepared pursuant to Article 8 or without submitting a fragnet showing delay to critical path, then Contractor may be prosecuted pursuant to the False Claim Act.

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ARTICLE 8 TIME AND SCHEDULE

8.1 DEFINITIONS

8.1.1 Contract Time

Contractor shall perform and reach Substantial Completion (See Article 1.1.46) within the time specified in the Agreement Form. Moreover, Contractor shall perform its Work in strict accordance with the Project Milestones in the Contract Documents and shall proceed on a properly developed and approved Baseline Schedule, which represents the Contractor's view of the practical way in which the Work will be accomplished. Note that Contract Time includes and incorporates all Float and other Baseline inclusions as noted in Article 8.3.2.1 and as otherwise specifically noted in Article 8.

8.1.2 Notice to Proceed

District may give a Notice to Proceed within ninety (90) days of the award of the bid by District. Once Contractor has received the notice to proceed, Contractor shall complete the Work in the period of time referenced in the Contract Documents.

In the event that District desires to postpone the giving of the Notice to Proceed beyond this three-month period, it is expressly understood that with reasonable notice to the Contractor, the giving of the date to proceed may be postponed by District. It is further expressly understood by Contractor, that Contractor shall not be entitled to any claim of additional compensation as a result of the postponement of the giving of the notice to proceed

If the Contractor believes that a postponement will cause a hardship to Contractor, Contractor may terminate the Contract with written notice to District within 10 days after receipt by Contractor of District's notice of postponement. It is further understood by Contractor that in the event that Contractor terminates the Contract as a result of postponement by the District, the District shall only be obligated to pay Contractor for the Work that Contractor had performed at the time of notification of postponement and the grounds for notification and hardship shall be subject to Audit pursuant to Article 13.11. Should Contractor terminate the Contract as a result of a notice of postponement, District may award the Contract to the next lowest responsible bidder.

8.1.3 Computation of Time

The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

8.1.4 Float

Float is time the total number of days an activity may be extended or delayed without delaying the Completion Date shown in the schedule. Float will fall into three categories: (1) Rain Days; (2) Governmental Delays; and, (3) Project Float. Project Float and Rain Days are owned by the Project and may be utilized as necessary for critical path delays once the days become available for consumption (i.e. the Rain Day arrives and is not utilized since rain did not occur or Work was performed on the interior of a building). However, Governmental Delay float shall not be utilized for purposes other than to address critical path delays that arise due to approvals, Inspector approvals or verifications on governmental forms.

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8.1.4.1 *Governmental Delay Float.* It is anticipated that there will be governmental generated delays. Specific to DSA approvals, it is anticipated that no less than twelve (12) days per calendar year shall be set aside as Governmental Float to be utilized on critical path delays. A pro-rated number of days shall be calculated based on length of Contract Time. (For example, a two (2) year Contract Time shall require twenty-four (24) days of Governmental Float. If the Contract Time is 182 days, then the Contract Time shall require six (6) days of Governmental Float) This Governmental Delay float must be incorporated into the schedule and should be incorporated in each critical activity as Contractor deems fit. Specifically, major categories of Work under the DSA 152 (Project Inspection Card) should be allocated Governmental Delay Float at the Contractor's discretion. Governmental Delay Float on the Project may exceed 12 days per one (1) year period, but Contractor is required to include not be less than 12 days of Governmental Delay Float during each one (1) year period.

Contractor's failure to establish a protocol for requesting inspections is not grounds to utilize Governmental Delay Float. As noted in Article 3.1.4, 48 hours advance notice of commencing Work on a new area is required after submitting form DSA 156 and under PR 13-01 Special Inspection reports are not required to be posted until at least 14 days after the Work was inspected. Failure to plan, and pay (if applicable) for quicker delivery of Special Inspections is not Governmental Delay Float under Article 8.1.4.1. If Governmental Delay Float is not utilized, this float is carried through to other DSA 152 categories of inspection and consumed over the course of the Project

Governmental Delay Float may be utilized for a DSA Stop Work Order regardless of fault as defined under Education Code section 17307.5(b).

8.1.4.2 *Inclement Weather (Rain Days).* The Contractor will only be allowed a time extension for unusually severe weather if it results in precipitation or other conditions which in the amount, frequency, or duration is in excess of the norm at the location and time of year in question as established by NOAA weather data. No less than 22 calendar days for each calendar year for Southern California will be allotted for in the Contractor's schedule for each winter weather period or carried at the end of the schedule as Rain Float. Float for weather days in other geographical regions shall be adjusted based on NOAA weather data for the geographical location. Contractor has anticipated all the days it takes to dry out and re-prepare areas that may be affected by weather delays which extend beyond the actual weather days. The weather days shall be shown on the schedule and if not used will become float for the Project's use. The Contractor will not be allowed a day-for-day weather delay for periods noted as float in the Schedule. The Contractor is expected to work seven (7) days per week (if necessary, irrespective of inclement weather), to maintain access, and to protect the Work under construction from the effects of inclement weather. Additional days beyond the NOAA shall be considered under the same criteria that weather days are granted below.

A Rain Day shall be granted by Architect or CM if the weather prevents the Contractor from beginning Work at the usual daily starting time, or prevents the Contractor from proceeding with seventy-five (75%) of the normal labor and equipment force towards completion of the day's current controlling item on the accepted schedule for a period of at least five hours, and the crew is dismissed as a result thereof, the Architect will designate such time as unavoidable delay and grant one (1) critical path activity calendar-day extension if there is no available float for the calendar year.

8.1.4.3 *Project Float.* The Contractor may determine some activities require a lesser duration than allocated and may set aside float in the Project Schedule. There shall be no early completion. Instead, to the extent float is either addressed at the end of the Project or throughout each category of critical path work, Project float may be used as necessary during the course of the Project and allocated on a first,

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come first serve basis. However, the use of float does not extend to Governmental Delay Float, which shall only be used for Governmental Delays.

8.2 HOURS OF WORK

8.2.1 Sufficient Forces

Contractors and Subcontractors shall continuously furnish sufficient forces to ensure the prosecution of the Work in accordance with the Construction Schedule.

8.2.2 Performance During Working Hours

Work shall be performed during regular working hours as permitted by the appropriate governmental agency except that in the event of an emergency, or when required to complete the Work in accordance with job progress, Work may be performed outside of regular working hours with the advance written consent of the District and approval of any required governmental agencies.

8.2.3 Costs for After Hours Inspections

If the Work done after hours is required by the Contract Documents, a Recovery Schedule, or as a result of the Contractor's failure to plan, and inspection must be conducted outside the Inspector's regular working hours, the costs of any after hour inspections, shall be borne by the Contractor.

If the District allows the Contractor to do Work outside regular working hours for the Contractor's convenience, the costs of any inspections required outside regular working hours shall be invoiced to the Contractor by the District and a Deductive Change Order shall be issued from the next Progress Payment.

If the Contractor elects to perform Work outside the Inspector's regular working hours, costs of any inspections required outside regular working hours shall be invoiced to the Contractor by the District and a Deductive Change Order from the next Progress Payment as a Deductive Change Order.

8.3 PROGRESS AND COMPLETION

8.3.1 Time of the Essence

Time limits stated in the Contract Documents are of the essence to the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

8.3.2 Baseline Schedule Requirements

8.3.2.1 *Timing:* Within ten (10) calendar days after Notice to Proceed, Contractor shall submit a practical schedule showing the order in which the Contractor proposes to perform the Work, and the dates on which the Contractor contemplates starting and completing the salient categories of the Work. This first schedule which outlines the Contractor's view of the practical way in which the Work will be accomplished is the Baseline Schedule. If the Contractor Fails to submit the Baseline Schedule within the ten (10) days noted, then District may withhold processing and approval of progress payments pursuant to Article 9.4 and 9.6.

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8.3.2.2 *District Review and Approval:* District, Architect and CM will review both a paper and electronic copy of Baseline Schedule and may provide comments as noted in this Article and either approve or disapprove the Baseline Schedule. All Schedules shall be prepared using an electronic scheduling program acceptable to District. All Schedules shall be delivered in an electronic format usable by the District. All logic ties and electronic information shall be included in the electronic copy of the Baseline Schedule that is delivered to the District.

8.3.2.3 *Schedule Must Be Within the Given Contract Time.* The Baseline Schedule shall not exceed time limits set forth in the Contract Documents and shall comply with all of the scheduling requirements as set forth in the Specifications and Contract Documents.

8.3.2.4 *Submittals Must Be Incorporated (See Articles 3.7 and 3.9):* Contractor shall include Submittals as line items in the Baseline Schedule as required under Article 3.7.2 and 3.9.6. Submittals shall not delay the Work, Milestones, or the Completion Date. Failure to include Submittals in the Baseline Schedule shall be deemed a material breach by the Contractor.

8.3.2.5 *Float Must Be Incorporated.* The Baseline Schedule must indicate the beginning and completion of all phases of construction and shall use the “critical path method” (commonly called CPM) for the value reporting, planning and scheduling, of all Work required under the Contract Documents. The Baseline Schedule must incorporate all Milestones in the Project and apply Governmental Float at each Milestone in the Contractor’s discretion. The Baseline Schedule shall incorporate any Schedule provided by the District as part of the bid and shall note durations that will not be adequate or should be shortened based on Contractor’s review. These changes shall be identified and incorporated into Contractor’s Baseline Schedule as long as requested changes are made within 10 days after the District chooses to move forward with the Project. Scheduling is necessary for the District’s adequate monitoring of the progress of the Work and shall be prepared in accordance with the time frame described in this Article 8. The Architect may disapprove of any Schedule or require modification to it if, in the opinion of the Architect or District, adherence to the any Schedule prepared by the Contractor will not cause the Work to be completed in accordance with the Agreement.

8.3.2.6 *No Early Completion.* Contractor shall not submit any Schedule showing early completion without indicating float time through the date set for Project completion by District. Contractor’s Baseline Schedule shall account for all days past early completion as float which belongs to the Project. Usage of float shall not entitle Contractor to any delay Claim or damages due to delay.

8.3.2.7 *Use of Schedule Provided in Bid Documents.* In some cases, the bid will include a preliminary schedule indicating Milestones and construction sequences for the Project along with general timing for the Project. The preliminary schedule is not intended to serve as the Baseline Schedule utilized for construction. It is up to the Contractor to study and develop a Baseline Schedule to address the actual durations and sequences of Work that is anticipated while maintaining the Milestones provided by the District. Contractor shall obtain information from Contractor’s Subcontractors and vendors on the planning, progress, delivery of equipment, coordination, and timing of availability of Subcontractors so a practical plan of Work is fully developed and represented in the Baseline Schedule.

8.3.2.8 *Incorrect Logic, Durations, Sequences, or Critical Path.* The District may reject or indicate durations, sequences, critical path or logic are not acceptable and request changes. The electronic copy of the Baseline Schedule shall have adequate information so logic ties, duration, sequences and critical path may be reviewed electronically. Contractor is to diligently rebuild and resubmit the Baseline Schedule to represent the Contractor’s plan to complete the Work and maintain Milestones at the

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next progress meeting, or before the next progress meeting. If Contractor is not able to build a Baseline Schedule that is acceptable to the District or Architect, the District reserves the right to utilize the unapproved originally submitted Baseline Schedule (See Article 8.3.2.12) and the comments submitted to hold Contractor accountable for timely delivery of Work and maintenance of Milestones. Furthermore, Contractor's representations in the Baseline Schedule, if unacceptable, may also be used as a basis for termination of the Contract under Article 14 if Contractor fails to adequately maintain the Schedule and falls significantly behind without undertaking the efforts to either submit and follow a Recovery Schedule or fail to submit a Recovery Schedule and make no effort toward recovery on the Project.

8.3.2.9 *Contractor Responsibility Even if Schedule Issues Are Not Discovered.* Failure on the Part of the District to discover errors or omissions in any Schedules submitted shall not be construed to be an approval of the error or omission and any flawed Schedule is not grounds for a time extension.

8.3.2.9 Inclusions in Baseline Schedule. In addition to scheduling requirements set forth at Article 8.3.2, Contractor is specifically directed to include (broken out separately) in Contractor's Baseline Schedule and all Schedule updates, the following items required pursuant to these General Conditions, including but not limited to:

1. Rain Day Float (excluding inclement weather) as required under Article 8.1.4.2. For example, if the NOAA provides 22 days of Rain Days, all 22 days must be incorporated and noted in the Baseline Schedule. Further, any days required to clean-up or dry out shall be included for operations that are likely to require a clean-up or dry out period. Days that are not utilized shall be considered float owned by the Project.
2. Governmental Delay Float under Article 8.1.4.1. This Governmental Delay Float shall only be utilized for Governmental Delays and shall not be considered available float owned by the Project. This float shall only be distributed to the Project upon the completion of the Project and shall be used to offset Liquidated Damages and shall not generate compensable delays.
3. Submittal and Shop Drawing schedule under Article 3.9.
4. Deferred Approvals under Article 3.9.
5. Time for separate contractors, including furniture installation and start up activities, under Article 6.1.
6. Coordination and timing of any Drawings, approvals, notifications, permitting, connection, and testing for all utilities for the Project. (See Article 2.1.4).
7. Testing, special events, or school activities

8.3.2.10 *Failure to include Mandatory Schedule Items.* District may withhold payment pursuant to Articles 9.3, 9.4 and 9.6. In lieu of withholding payment for failure to include Mandatory Schedule Items, after the District or Architect has notified the Contractor of failure to meet the Baseline

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Schedule or Updated Schedule requirements and provided a written notification of this failure and provided a written notice of Schedule preparation errors, and the Contractor fails to correct the noted deficiencies or the Contractor does not provide an updated Baseline Schedule correcting the deficiencies, then Contractor shall not be granted an extension of time for failure to obtain necessary items and approvals under Article 8.3.2 and for the time required for failure to comply with laws, building codes, and other regulations (including Title 24 of the California Code of Regulations). Contractor shall maintain all required Article 8.3.2 Schedule items in the Baseline Schedule and indicate any days that have been used as allowed in Article 8. If Contractor fails to include all Article 8.3.2 items in its Baseline Schedule or Schedule Updates and the District either utilizes an Unapproved Schedule under Article 8.3.2.12 or does not object to the inclusion of required scheduling items, then all mandatory Schedule inclusions, including float, shall be utilized in the District's discretion. If the Contract Time is exceeded, then Contractor shall be subject to the assessment of Liquidated Damages pursuant to Article 8.4.

8.3.2.11 *Failure to Meet Requirements.* Failure of the Contractor to provide proper Schedules as required by this Article and Article 9 is a material breach of the Contract and grounds for Termination pursuant to Article 14. The District, at its sole discretion, may choose, instead, to withhold, in whole or in part, any Progress Payments or Retention amounts otherwise payable to the Contractor.

8.3.2.12 *Use of an Unapproved Baseline Schedule.* If the Baseline Schedule submitted by the Contractor is unacceptable to the District (i.e. failing to meet the requirements of Article 8.3.2) and Contractor does not incorporate or address the written comments to the Baseline Schedule and a Baseline Schedule is not approved, but due to extreme necessity, the District moves forward without an approved Baseline Schedule, Contractor shall diligently revise and meet Schedule update requirements of Article 8 and incorporate all Article 8.3.2 comments in all updates). However, for purposes of Termination pursuant to Article 14, the unapproved Baseline Schedule initially submitted shall be treated as the Baseline Schedule with durations shortened or revised to accommodate all float, all mandatory Schedule requirements under Article 8.3.2, any requirements in the Contract Documents, and all revisions by the District or Architect.

8.3.3 Update Schedules

8.3.3.1 *Updates Shall Be Based on Approved Baseline Schedule.* Except in the case where there has not been agreement as to a Baseline Schedule, the approved Baseline Schedule shall be used to build future Schedule updates. Schedule updates shall be a CPM based Schedule consistent with the Baseline Schedule requirements of 8.3.2

In the case that no Baseline has been approved, Schedule updates shall be provided monthly and each update shall incorporate all comments and revisions noted as not complying with the requirements of Article 8.3.2. Contractor shall be held to the Article 8.3.2.12 unapproved Baseline Schedule, inclusive of all Milestones, float, comments and revisions by the District and Architect, all required Baseline Schedule Inclusions under Article 8.3.2, and any requirements in the Contract Documents.

8.3.3.2 *Schedule Updates.* Contractor shall update the approved Schedule each month to address actual start dates and durations, the percent complete on activities, actual completion dates, estimated remaining duration for the Work in progress, estimated start dates for Work scheduled to start at future times and changes in duration of Work items

8.3.3.3 *Listing of Items Causing Delays.* Schedule updates shall provide a listing of activities which are causing delay in the progress of Work and a narrative shall be provided showing a

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description of problem areas, anticipated delays, and impacts on the Construction Schedule. Simply stating "District Delay" or "Architect Delay" shall be an inadequate listing. Delays shall only be listed if they meet the requirements of Article 8.4.

8.3.3.4 *Recovery Schedule.* In addition to providing a schedule update every thirty (30) days, the Contractor, if requested by the Architect or District, shall take the steps necessary to improve Contractor's progress and demonstrate to the District and Architect that the Contractor has seriously considered how the lost time, the Completion Date, or the Milestones that are required to be met within the terms of the Contract. Contractor shall immediately provide a Recovery Schedule showing how Milestones and the Completion Date will be met. In no case, shall a Recovery Schedule be provided later than ten (10) days following the request for a Recovery Schedule from the Architect or District.

- a. Failure to Provide a Recovery Schedule. Shall subject Contractor to the assessment of Liquidated Damages for failure to meet the Contract Time. Refusal or failure to provide a Recovery Schedule shall be considered a substantial failure of performance and a material breach of Contract and may result in Termination of the Contract pursuant to Article 14.
- b. Recovery Schedule Acceleration without Additional Cost. The District may require Contractor prepare a Recovery Schedule showing how the Project shall be accelerated, without any additional cost to the District. The District may order, without additional cost, the following:
 1. Increase the number of shifts;
 2. Utilize overtime to recover the approved Schedule; and/or
 3. Increase the days when Work occurs, including weekends, at the Project and at any manufacturer's plant.
- c. Recovery Schedule Acceleration without Additional Cost. If Contractor disputes that the Recovery Schedule acceleration shall be issued without additional costs, the Contractor shall submit concurrent with Recovery Schedule acceleration notice pursuant to Articles 8.4.3 and 8.4.4.

8.4 EXTENSIONS OF TIME - LIQUIDATED DAMAGES

8.4.1 Liquidated Damages

CONTRACTOR AND DISTRICT HEREBY AGREE THAT THE EXACT AMOUNT OF DAMAGES FOR FAILURE TO COMPLETE THE WORK WITHIN THE TIME SPECIFIED IS EXTREMELY DIFFICULT OR IMPOSSIBLE TO DETERMINE. IF THE WORK IS NOT SUBSTANTIALLY COMPLETED IN THE TIME SET FORTH IN THE AGREEMENT, IT IS UNDERSTOOD THAT THE DISTRICT WILL SUFFER DAMAGES. IT BEING IMPRACTICAL AND UNFEASIBLE TO DETERMINE THE AMOUNT OF ACTUAL DAMAGE, IT IS AGREED THE CONTRACTOR SHALL PAY TO THE DISTRICT THE AMOUNT LIQUIDATED DAMAGES SET FORTH IN THE AGREEMENT, FOR EACH CALENDAR DAY OF DELAY IN REACHING SUBSTANTIAL COMPLETION (SEE ARTICLE 1.1.46). CONTRACTOR AND ITS SURETY SHALL

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BE LIABLE FOR THE AMOUNT THEREOF PURSUANT TO GOVERNMENT CODE SECTION 53069.85.

8.4.2 Delay

Except and only to the extent provided under Article 7 and Article 8, by signing the Agreement, Contractor agrees to bear the risk of delays to Completion of the Work and that Contractor's bid for the Project was made with full knowledge of this risk.

In agreeing to bear the risk of delays to complete the Work, Contractor understands that, except and only to the extent provided otherwise in Article 7 and 8, the occurrence of events that delay the Work shall not excuse Contractor from its obligation to achieve Completion of the Project within the Contract Time, and shall not entitle the Contractor to an adjustment to the Contract time.

8.4.3 Excusable Delay

Contractor shall not be charged for Liquidated Damages because of any delays in completion of Work which are not the fault or negligence of Contractor or its Subcontractors, arising from Rain Float or Project Float, including acts of God, as defined in Public Contract Code section 7105, acts of enemy, epidemics and quarantine restrictions. Any approved delays caused by acts of God, as defined in Public Contract Code section 7105, acts of enemy, epidemics, pandemics, and quarantine restrictions (collectively, "Force Majeure Events") shall be deemed non-compensable excusable delays. Contractor shall within five (5) calendar days of beginning of any such delay notify District in writing of causes of delay; thereupon District shall ascertain the facts and extent of delay and grant extension of time for completing Work when, in its judgment, the findings of fact justify such an extension. Extensions of time shall apply only to that portion of Work affected by delay, and shall not apply to other portions of Work not so affected. An extension of time may only be granted after proper compliance with Article 8.3 requiring preparation and submission of a properly prepared CPM schedule.

8.4.3.1 *Excusable Delay Is Not Compensable.* No extended overhead, general conditions costs, impact costs, out-of-sequence costs or any other type of compensation, by any name or characterization, shall be paid to the Contractor for any delay to any activity not designated as a critical path item on the latest approved Project schedule or if caused by Force Majeure Events.

8.4.3.2 *Notification.* The Contractor shall notify the Architect in writing of any anticipated delay and its cause, in order that the Architect may take immediate steps to prevent, if possible, the occurrence or continuance of delay, and may determine whether the delay is to be considered avoidable or unavoidable, how long it continues, and to what extent the prosecution and completion of the Work might be delayed thereby.

8.4.3.3 *Extension Request.* In the event the Contractor requests an extension of Contract time for unavoidable delay, such request shall be submitted in accordance with the provisions in the Contract Documents governing changes in Work (See Article 7). When requesting time, i.e., extensions, for proposed Change Orders, they must be submitted with the proposed Change Order with full justification and documentation. If the Contractor fails to submit justification with the proposed Change Order it waives its right to a time extension at a later date. Such justification must be based on the official Contract schedule as updated at the time of occurrence of the delay or execution of Work related to any changes to the scope of Work. Blanket or general claims for extra days without specific detailed information as required herein

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or a blanket or general reservation of rights do not fulfill the requirements of this Article and shall be denied. The justification must include, but is not limited to, the following information:

- a. The duration of the activity relating to the changes in the Work and the resources (manpower, equipment, material, etc.) required to perform these activities within the stated duration.
- b. Logical ties to the official Baseline Schedule or Approved Updated Schedule for the proposed changes and/or delay showing the activity/activities in the schedule whose start or completion dates are affected by the change and/or delay. (A fragnet of any delay of over ten (10) days must be provided.)

The Contractor and District understand and expressly agree that insofar as Public Contract Code section 7102 may apply to changes in the Work or delays under this Contract, the actual delays and damages, if any, and time extensions are intended to, and shall provide, the exclusive and full method of compensation for changes in the Work and construction delays.

8.4.4 Notice by Contractor Required

The Contractor shall within five (5) calendar days of beginning of any such delay notify the District in writing of causes of delay with justification and supporting documentation. In the case of a Recovery Schedule pursuant to Article 8.3.3.4, Contractor shall submit written notice concurrent with the Recovery Schedule. District will then ascertain the facts and extent of the delay and grant an extension of time for completing the Work when, in its judgment, the findings of fact justify such an extension. Extensions of time shall apply only to that portion of the Work affected by the delay and shall not apply to other portions of the Work not so affected.

Claims relating to time extensions shall be made in accordance with applicable provisions of Article 7.

8.4.4.1 *Adjustment for Compensable Delays.* The Schedule may be adjusted for a delay if, and only if, Contractor undertakes the following:

- a. Contractor submits a timely COR or CO pursuant to the requirements of Article 7.
- b. Contractor submits a fragnet showing the critical path delay caused by the COR, CO, Changed Condition, CCD, or ICD
- c. Contractor has addressed all required float days in the Fragnet.
- d. Contractor submits a complete breakdown of all costs incurred utilizing the format of Article 7.7.3

8.4.5 No Additional Compensation for Coordinating Governmental Submittals and the Resulting Work

CONTRACTOR HAS PLANNED ITS WORK AHEAD OF TIME AND IS AWARE THAT GOVERNMENTAL AGENCIES, SUCH AS THE GAS COMPANIES, ELECTRICAL UTILITY COMPANIES, WATER DISTRICTS AND OTHER AGENCIES MAY HAVE TO APPROVE

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CONTRACTOR PREPARED DRAWINGS OR APPROVE A PROPOSED INSTALLATION. CONTRACTOR HAS INCLUDED DELAYS AND DAMAGES WHICH MAY BE CAUSED BY SUCH AGENCIES IN CONTRACTOR'S BID AND HAS INCLUDED ADEQUATE TIME IN THE CONTRACTOR'S BASELINE SCHEDULE. FAILURE TO ADEQUATELY PLAN AND SCHEDULE IS NOT A BASIS TO USE GOVERNMENTAL DELAY FLOAT.

8.4.6 District Right to Accelerate the Work

The District may direct the Contractor to meet schedule requirements when the Work has been delayed. The District shall compensate the Contractor for the additional costs incurred by acceleration to the extent that such costs are directly attributable to the acceleration and are incurred through no fault or negligence of the Contractor.

8.4.6.1 *Management of Acceleration.* Contractor acceleration shall not include Work that is part of the scope of Work detailed in the Plans and Specifications. Instead, the acceleration costs shall be premium or overtime and quantifiable additional work added to the Project meant to accelerate the Project. Contractor is directed to keep consistent crews on the Project so time can be tracked. If crews are circulated off the Project or crews brought in only for overtime, the District may be charged for Contract Work and not accelerated time. In such case, the District may object to the costs submitted.

8.4.6.2 *Costs for Acceleration.* Cost for Acceleration shall be supported by backup documentation, and time sheets signed by the Inspector for each day work has been performed, at or near the time when the Work was performed. A listing on the time sheet shall document all labor, materials and services utilized that day and provide areas of work, and amount of work performed. Contractor shall comply with submission requirements of Article 7.7.

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ARTICLE 9 PAYMENTS AND COMPLETION

9.1 CONTRACT SUM

The Contract Sum or Contract Price is stated in the Agreement and, including authorized adjustments, is the total amount payable by the District to the Contractor for performance of the Work under the Contract Documents.

9.2 COST BREAKDOWN

9.2.1 Required Information

Contractor shall furnish the following:

- a. Within ten (10) days after Notice to Proceed, a detailed breakdown of the Contract Price (hereinafter "Schedule of Values") for each Project, Site, building, Milestone or other meaningful method to measure the level of Project Completion as determined by the District shall be submitted as a Submittal for the Project.;
- b. Within ten (10) days after the date of the Notice to Proceed, a schedule of estimated monthly payment requests due the Contractor showing the values and construction time of the various portions of the Work to be performed by it and by its Subcontractors or material and equipment suppliers containing such supporting evidence as to its correctness as the District may require;
- c. Within ten (10) days after the date of the Notice to Proceed, address, telephone number, telecopier number, California State Contractors License number, classification and monetary value of all subcontracts for parties furnishing labor, material, or equipment for completion of the Project.

9.2.2 Information and Preparation of Schedule of Values

9.2.2.1 *Break Down of Schedule of Values.* Schedule of Values shall be broken down by Project, site, building, Milestone, or other meaningful method to measure the level of Project Completion as determined by the District.

9.2.2.2 *Based on Contractor Bid Costs.* The Schedule of Values shall be based on the costs from Contractor's bid to the District. However, the submission of the Schedule of Values shall not be front loaded so the Contractor is paid a greater value than the value of the Work actually performed and shall not shift funds from parts of the Project that are later to Work that is performed earlier.

9.2.2.3 Largest Dollar Value for Each Line Item. Identify Subcontractors and materials suppliers proposed to provide portions of Work equal to or greater than ten thousand dollars (\$10,000) or one-half of one percent (0.5%) of their Contract Price, whichever is less.

9.2.2.4 *Allowances.* Any Allowances provided for in the Contract shall be a line item in the Schedule of Values.

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9.2.2.5 *Labor and Materials Shall Be Separate.* Labor and Materials shall be broken into two separate line items unless specifically agreed in writing by the District.

9.2.3 District Approval Required

The District shall review all submissions received pursuant to Article 9.2 in a timely manner. All submissions must be approved by the District before becoming the basis of any payment.

9.3 PROGRESS PAYMENTS

9.3.1 Payments to Contractor

Unless there is a resolution indicating that the Work for the Project is substantially complex, within thirty-five (35) days after approval of the Request for Payment, Contractor shall be paid a sum equal to ninety-five percent (95%) of the value of the Work performed (as certified by Architect and Inspector and verified by Contractor) up to the last day of the previous month, less the aggregate of previous payments. In the case of a Project designated substantially complex, the sum paid to the Contractor shall be equal to ninety percent (90%) of the value of the Work performed (as certified by the Architect and Inspector and verified by Contractor). The value of the Work completed shall be the Contractor's best estimate. Work completed as estimated shall be an approximation or estimate only and no mistake, inaccuracy, error or falsification in said any approved estimate shall operate to release the Contractor, or any Surety upon any bond, from damages arising from such Work, or from the District's enforcement of each and every provision of this Contract including but not limited to the Performance Bond and Payment Bond. The District shall have the right to subsequently to correct any mistake, inaccuracy, error or falsification made or otherwise set forth in any approved Request for Payment and such correction may occur in any future Payment Application or in the Retention Payment to the Contractor. No Surety upon any bond shall be relieved, released or exonerated of its obligations under this Contract or any applicable bond when the District is unable to correct an overpayment to the Contractor due to any abandonment by the Contractor or termination by the District.

The Contractor shall not be entitled to have any payment requests processed, or be entitled to have any payment made for Work performed, so long as any lawful or proper direction given by the District concerning the Work, or any portion thereof, remains incomplete.

Notwithstanding anything to the contrary stated above, the Contractor may include in its Request for Payment the value of any structural steel, glue laminated beams, trusses, bleachers and other such custom-made materials prepared specifically for the Project and unique to the Project so long as all of the following requirements are satisfied:

- a. The aggregate cost of materials stored off-site shall not exceed Twenty Five Thousand Dollars (\$25,000) at any time or as otherwise agreed to be District in writing;
- b. Title to such materials shall be vested in the District as evidenced by documentation satisfactory in form and substance to the District, including, without limitation, recorded financing statements, UCC filings and UCC searches;
- c. With each Contractor Request for Payment, the Contractor shall submit to the District a written list identifying each location where materials are stored off-site

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(which must be a bonded warehouse) and the value of the materials at each location. The Contractor shall procure insurance satisfactory to the District (in its reasonable discretion) for materials stored off-site in an amount not less than the total value thereof;

- d. The consent of any Surety shall be obtained to the extent required prior to payment for any materials stored off-site;
- e. Representatives of the District shall have the right to make inspections of the storage areas at any time; and
- f. Such materials shall be: (1) protected from diversion, destruction, theft and damage to the reasonable satisfaction of the District; (2) specifically marked for use on the Project; and (3) segregated from other materials at the storage facility.

9.3.2 Purchase of Materials and Equipment and Cost Fluctuations

The Contractor is required to order, obtain, and store materials and equipment sufficiently in advance of its Work at no additional cost or advance payment from District to assure that there will be no delays. Contractor understands that materials fluctuate in value and shall have adequately addressed market fluctuations through agreements with Contractor vendors or by other means. Contractor further understands and incorporates into Contractor's bid cost any wage rate increases during the Project for the Contractor's labor force as well as all other Subcontractor and vendor labor forces. District shall not be responsible for market fluctuations in costs or labor rate increases during the Project. Contractor further has incorporated any and all cost increases in areas of Work where there may be schedule variations so that cost increases are not passed through to the District.

9.3.3 No Waiver

No payment by District hereunder shall be interpreted so as to imply that District has inspected, approved, or accepted any part of the Work. Contractor specifically understands that Title 24 Section 4-343 which states:

"It is the duty of the contractor to complete the work covered by his or her contract in accordance with the approved Plans and Specifications therefore. The contractor in no way is relieved of any responsibility by the activities of the Architect, Engineer, Inspector or DSA in the performance of such duties... In no case, however, shall the instruction of the Architect or registered Engineer be construed to cause work to be done with is not in conformity with the approved Plans, Specifications, and change orders..."

Notwithstanding any payment, the District may enforce each and every provision of this Contract which includes, but is not limited to, the Performance Bond and Payment Bond. The District may correct any error subsequent to any payment. In no event shall the Contractor or the Surety be released or exonerated from performance under this Contract when the District overpays the Contractor based upon any mistake, inaccuracy, error or falsification in any estimate that is included in any Request for Payment.

9.3.4 Issuance of Certificate of Payment

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The Architect shall, within seven (7) days after receipt of the Contractor's Application for Payment, either approve such payment or notify the Contractor in writing of the Architect's reasons for withholding approval in whole or in part as provided in Article 9.6. The review of the Contractor's Application for Payment by the Architect is based on the Architect's observations at the Project and the data comprising the Application for Payment that the Work has progressed to the point indicated and that, to the best of the Architect's knowledge, information, and belief, the quality of the Work is in accordance with the Contract Documents. In some cases, the Architect may act upon or rely on the evaluation of the Work by the Inspector. This review of Payment Applications is sometimes called a "Pencil Draft." District's return of a Pencil Draft shall constitute the District's dispute of the Payment Application that has been submitted. Contractor shall promptly respond to Pencil Drafts or Contractor's Payment Applications may be delayed. Contractor's failure to promptly respond to a Pencil Draft shall qualify as a delay in the prompt payment of a Request for Payment or Request for Retention. The foregoing representations are subject to: (1) an evaluation of the Work for conformance with the Contract Documents, (2) results of subsequent tests and inspections, (3) minor deviations from the Contract Documents correctable prior to completion, and (4) specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute the Contractor's verified representation that the Contractor is entitled to payment in the amount certified.

9.3.5 Payment of Undisputed Contract Payments

In accordance with Public Contract Code section 7100, payments by the District to the Contractor for any and all undisputed amounts (including all Progress Payments, Final Payments or Retention Payment) is contingent upon submission of a proper and accurate Payment Application and the Contractor furnishing the District with a release of all Claims against the District related to such undisputed amounts. Disputed Contract Claims in stated amounts may be specifically excluded by the Contractor from the operation of the release. If, however, the Contractor specifically excludes any Claims, the Contractor shall provide details such as a specific number of disputed days or costs of any such exclusion in accordance with Articles 4.6 and 7.7.

9.4 APPLICATIONS FOR PROGRESS PAYMENTS

9.4.1 Procedure

9.4.1.1 *Application for Progress.* On or before the fifth (5th) day of each calendar month during the progress of the Work, Contractor shall submit to the Architect an itemized Application for Progress Payment for operations completed. Such application shall be notarized, if required, and supported by the following or such portion thereof as Architect requires:

1. The amount paid to the date of the Payment Application to the Contractor, to all its Subcontractors, and all others furnishing labor, material, or equipment for its Contract;
2. The amount being requested under the Payment Application by the Contractor on its own behalf and separately stating the amount requested on behalf of each of the Subcontractors and all others furnishing labor, material, and equipment under the Contract;
3. The balance that will be due to each of such entities after said payment is made;

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4. A certification that the As-Built Drawings and Annotated Specifications are current;
5. Itemized breakdown of Work done for the purpose of requesting partial payment;
6. An updated or approved Baseline Schedule or other Schedule updates in conformance with Article 8;
7. Failure to submit an updated Schedule for the month or any previous month;
8. The additions to and subtractions from the Contract Price and Contract Time;
9. A summary of the Retention held;
10. Material invoices, evidence of equipment purchases, rentals, and other support and details of cost as the District may require from time to time;
11. The percentage of completion of the Contractor's Work by line item;
12. An updated Schedule of Values from the preceding Application for Payment;
13. Prerequisites for Progress Payments; and
14. Any other information or documents reasonably requested by the District, Architect, Inspector or CM (if applicable).

9.4.1.2 *First Payment Request.* The following items, if applicable, must be completed before the first payment request will be accepted for processing:

1. Installation of the Project sign;
2. Receipt by Architect of Submittals;
3. Installation of field office;
4. Installation of temporary facilities and fencing;
5. Submission of documents listed in the Article 9.2 relating to Contract Price breakdown;
6. Preliminary schedule analysis, due within 10 days after Notice to Proceed;
7. Contractor's Baseline Schedule (to be CPM based in conformance with Article 8);
8. Schedule of unit prices, if applicable;

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9. Submittal Schedule;
10. Copies of necessary permits;
11. Copies of authorizations and licenses from governing authorities;
12. Initial progress report;
13. Surveyor qualifications;
14. Written acceptance of District's survey of rough grading, if applicable;
15. List of all Subcontractors, with names, license numbers, telephone numbers, and scope of work;
16. All bonds and insurance endorsements; and
17. Resumes of General Contractor's Project Manager, and if applicable, job site secretary, record documents recorder, and job site Superintendent.

9.4.1.3 *Second Payment Request.* The second payment request will not be processed until all Submittals and Shop Drawings have been accepted for review by the Architect.

9.4.1.4 *All Payment Requests.* No payment requests will be processed unless Contractor has submitted copies of the certified payroll records for the Work which correlates to the payment request and a proper CPM schedule pursuant to Article 8 is submitted.

9.4.1.5 *Final Payment Application (90% or 95%).* See Article 9.11.1

9.4.1.6 *Final Payment Application (100%).* See Article 9.11.3

9.5 STOP NOTICE CLAIMS AND WARRANTY OF TITLE

The Contractor warrants title to all Work. The Contractor further warrants that all Work is free and clear of liens, claims, security interests, stop notices, or encumbrances in favor of the Contractor, Subcontractors, material and equipment suppliers, or other persons or entities making a claim by reason of having provided labor, materials, and equipment relating to the Work. Failure to keep work free of liens, stop notices, claims, security interests or encumbrances is grounds to make a claim against Contractor's Payment and Performance Bond to immediately remedy and defend.

If a lien or stop notice of any nature should at any time be filed against the Work or any District property, by any entity which has supplied material or services at the request of the Contractor, Contractor and Contractor's Surety shall promptly, on demand by District and at Contractor's and Surety's own expense, take any and all action necessary to cause any such lien or stop notice to be released or discharged immediately therefrom.

If the Contractor fails to furnish to the District within ten (10) calendar days after written demand by the District, satisfactory evidence that a lien or stop notice has been so released, discharged, or secured, then District may discharge such indebtedness and deduct the amount required therefor, together with any and all losses, costs, damages, and attorney's fees and expense incurred or suffered by District from any

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sum payable to Contractor under the Contract. In addition, any liens, stop notices, claims, security interests or encumbrances shall trigger the indemnification requirements under Article 3.15 and the Agreement Form, and shall act as a trigger under Civil Code section 2778 and 2779 requiring reimbursement for any and all costs following the District's written demand has been made. Any withholdings by the District for stop notices in accordance with Civil Code section 9358 shall not be a basis by the Contractor to make a Claim for interest penalties under Public Contract Code sections 7107 or 20104.50.

9.6 DECISIONS TO WITHHOLD PAYMENT

9.6.1 Reasons to Withhold Payment

The District may withhold payment in whole, or in part, to the extent reasonably necessary to protect the District if, in the District's opinion, the representations to the District required by Article 9.4 cannot be made. The District may withhold payment, in whole, or in part, to such extent as may be necessary to protect the District from loss because of, but not limited to:

- a. Defective Work not remedied;
- b. Stop notices served upon the District;
- c. Liquidated Damages assessed against the Contractor;
- d. The cost of Completion of the Contract if there exists reasonable doubt that the Work can be Completed for the unpaid balance of any Contract Price or by the completion date;
- e. Damage to the District or other contractor;
- f. Unsatisfactory prosecution of the Work by the Contractor;
- g. Failure to store and properly secure materials;
- h. Failure of the Contractor to submit on a timely basis, proper and sufficient documentation required by the Contract Documents, including, without limitation, acceptable monthly progress schedules, Shop Drawings, Submittal schedules, Schedule of Values, Product Data and samples, proposed product lists, executed Change Order, Construction Change Documents, and verified reports;
- i. Failure of the Contractor to maintain As-Built Drawings;
- j. Erroneous estimates by the Contractor of the value of the Work performed, or other false statements in an Payment Application;
- k. Unauthorized deviations from the Contract Documents (including but not limited to Unresolved Notices of Deviations (DSA Form 154));
- l. Failure of the Contractor to prosecute the Work in a timely manner in compliance with established progress schedules and completion dates.

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- m. Failure to properly pay prevailing wages as defined in Labor Code section 1720, et seq.;
- n. Failure to properly maintain or clean up the Site;
- o. Payments to indemnify, defend, or hold harmless the District;
- p. Any payments due to the District including but not limited to payments for failed tests, or utilities changes or permits;
- q. Failure to submit an acceptable Baseline Schedule or any Schedule or Schedule update in accordance with Article 8;
- r. Failure to pay Subcontractor or suppliers as required by Article 9.8.1
- s. Failure to secure warranties, including the cost to pay for warranties;
- t. Failure to provide releases from material suppliers or Subcontractors when requested to do so;
- u. Items deducted pursuant to Article 2.2;
- v. Incomplete Punch List items under Article 9.9.1.1 which have gone through the Article 2.2 process; or
- w. Allowances that have not been used.

9.6.2 Reallocation of Withheld Amounts

District may, in its discretion, apply any withheld amount to payment of outstanding claims or obligations as defined in Article 9.6.1 and 9.5. In so doing, District shall make such payments on behalf of Contractor. If any payment is so made by District, then such amount shall be considered as a payment made under Contract by District to Contractor and District shall not be liable to Contractor for such payments made in good faith. Such payments may be made without prior judicial determination of claim or obligation. District will render Contractor an accounting of such funds disbursed on behalf of Contractor.

If Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents or fails to perform any provision thereof, District may, after ten (10) calendar days written notice to the Contractor and without prejudice to any other remedy make good such deficiencies. The District shall adjust the total Contract price by reducing the amount thereof by the cost of making good such deficiencies. If District deems it inexpedient to correct Work which is damaged, defective, or not done in accordance with Contract provisions, an equitable reduction in the Contract Price (of at least 150% of the estimated reasonable value of the nonconforming Work) shall be made therefor.

9.6.3 Payment After Cure

When the grounds for declining approval are removed, payment shall be made for amounts withheld because of them. No interest shall be paid on any retainage or amounts withheld due to the failure of the Contractor to perform in accordance with the terms and conditions of the Contract Documents.

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9.7 NONCONFORMING WORK

Contractor shall promptly remove from premises all Work identified by District as failing to conform to the Contract whether incorporated or not. Contractor shall promptly replace and re-execute its own Work to comply with the Contract without additional expense to District and shall bear the expense of making good all Work of other contractors destroyed or damaged by such removal or replacement.

If Contractor does not remove such Work which has been identified by District as failing to conform to the Contract Documents within a reasonable time, fixed by written notice, District may remove it and may store the material at Contractor's expense. If Contractor does not pay expenses of such removal within ten (10) calendar days' time thereafter, District may, upon ten (10) calendar days' written notice, sell such materials at auction or at private sale and shall account for net proceeds thereof, after deducting all costs and expenses that should have been borne by Contractor.

9.8 SUBCONTRACTOR PAYMENTS

9.8.1 Payments to Subcontractors

No later than ten (10) days after receipt, or pursuant to Business and Professions Code section 7108.5, the Contractor shall pay to each Subcontractor, out of the amount paid to the Contractor on account of such Subcontractor's portion of the Work, the amount to which said Subcontractor is entitled. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

9.8.2 No Obligation of District for Subcontractor Payment

The District shall have no obligation to pay, or to see to the payment of, money to a Subcontractor except as may otherwise be required by law.

9.8.3 Payment Not Constituting Approval or Acceptance

An approved Request for Payment, a progress payment, a Certificate of Substantial Completion, or partial or entire use or occupancy of the Project by the District shall not constitute acceptance of Work that is not in accordance with the Contract Documents.

9.8.4 Joint Checks

District shall have the right, if necessary for the protection of the District, to issue joint checks made payable to the Contractor and Subcontractors and material or equipment suppliers. The joint check payees shall be responsible for the allocation and disbursement of funds included as part of any such joint payment. In no event shall any joint check payment be construed to create any contract between the District and a Subcontractor of any tier, any obligation from the District to such Subcontractor, or rights in such Subcontractor against the District. The District may choose to issue joint checks at District's sole discretion and only after all the requirements of that particular school district and county are specifically met. Some school districts cannot issue joint checks, so the ability to issue joint checks depends on the school district and the specific circumstances.

9.9 COMPLETION OF THE WORK

9.9.1 Close-Out Procedures

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9.9.1.1 *Incomplete Punch Items.* When the Contractor considers the Work Substantially Complete (See Article 1.1.46 for definition of Substantially Complete), the Contractor shall prepare and submit to the District a comprehensive list of minor items to be completed or corrected (hereinafter “Incomplete Punch Items” or “Punch List”). The Contractor and/or its Subcontractors shall proceed promptly to complete and correct the Incomplete Punch Items listed. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Contractor is aware that Title 24 Section 4-343(a) provides:

“RESPONSIBILITIES. IT IS THE DUTY OF THE CONTRACTOR TO COMPLETE THE WORK COVERED BY HIS OR HER CONTRACT IN ACCORDANCE WITH THE APPROVED PLANS AND SPECIFICATIONS THEREFOR. THE CONTRACTOR IN NO WAY IS RELIEVED OF ANY RESPONSIBILITY BY THE ACTIVITIES OF THE ARCHITECT, ENGINEER, INSPECTOR OR DSA IN THE PERFORMANCE OF SUCH DUTIES.

9.9.1.2 *Punch List Is Prepared Only After the Project Is Substantially Complete.* If any of the conditions noted in Article 1.1.46 as defining Substantial Completion are not met, the Inspector, Architect or District may reject Contractor’s Incomplete Punch Items as premature. If the Architect and Inspector commence review of Incomplete Punch Items, all rights are reserved until the Project actually meets the definition of Substantially Complete. Liquidated Damages, warranties, and other contractual rights are not affected by Incomplete Punch Items unless otherwise addressed in these General Conditions.

Once the Inspector and the Architect determine the Project is Substantially Complete, a Certificate of Substantial Completion shall be issued. The Inspector and Architect shall prepare a Punch List of items which is an inspection report of the Work, if any, required in order to complete the Contract Documents and ensure compliance with the DSA Approved Plans so the Project may be Completed by the Contractor and a final DSA Close-Out is approved. When all Work for the Project is Complete, including Punch Lists and all Work complies with the approved Contract Documents and Change Orders, the Project has reached Final Completion.

9.9.1.3 *Time for Completion of Punch List.* Contractor shall only be given a period of no more than thirty (30) days to complete the Punch List for the Project. During the Punch List period, the Contractor’s Superintendent and Project Manager shall remain engaged in the Project and shall not be removed or replaced. If the Punch List is not completed at the end of the Punch List time then Contractor shall issue a valued Punch List within 5 days after the date the Punch List time ends. If Contractor does not issue such a list, the District or Architect may issue a valued Punch List to the Contractor and withhold up to 150% of the value of the Punch List Work pursuant to Article 2.2 of this Agreement.

Failure to issue a timely written request for additional time to complete Punch List shall result in the deletion of the remaining Punch List Work pursuant to Article 2.2 and the issuance of a Deductive Change Order.

- a. Extension of Time to Complete Punch List. If Contractor cannot finish the Punch List Work during the time period allotted under Article 9.9.1.3, the Contractor may make a written request for a Non-Compensable Punch List time extension accompanied by an estimate of the number of additional days it will take to complete the Punch List Work for a written consent from the District to allow continued Punch List Work. Punch List

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time extensions are a maximum of thirty (30) days for each request and must be accompanied by an itemized valued Punch List.

- b. If there is no valued Punch List accompanying any request or if Contractor intends to undertake Punch List without the continued support and supervision of its Superintendent and Project Manager (as required under Article 3.2), the District, Construction Manager or Architect may issue a valued Punch List, reject the Punch List Time Extension and deduct 150% of the valued Punch List pursuant to Article 2.2 and proceed to Close-Out the Project. Contractor shall cease work on the Project and proceed to complete Contractor's Retention Payment Application and complete the Work for the Project required pursuant to Article 9.11.3.

9.9.1.4 *District Rejection of Written Request for Punch List Time Extensions.* Following sixty (60) Days of Punch List under Article 9.9.1.3, the District has the option of rejecting Punch List Time Extension requests. The District may proceed under Article 2.2 and deduct the value of remaining Punch List Work pursuant to Article 2.2. If the District rejects the Punch List Time Extension request then Contractor shall cease Work on the Project and proceed to Final Inspection pursuant to Article 9.11.2.

9.9.1.5 *Punch List Liquidated Damages to Compensate for Added District Project Costs.* If the total time utilized for Punch List exceeds sixty (60) days [the thirty (30) day period under Article 9.9.1.3 plus an additional thirty (30) day period that has been requested in writing], and the District grants an additional written Punch List Time Extension that exceeds sixty (60) days of Punch List, then Contractor shall be charged Liquidated Damages of at least \$750 per day for continued Punch List Work to partially compensate the Inspector, Architect, and Construction Manager's extended time on the Project. This Punch List Liquidated Damage number is based on anticipated cost for an Inspector on site and additional costs for the Architect and Construction Manager to reinspect Punch List items and perform the administration of the Close-out.

Contractor received thirty (30) days without any charges for Punch List Liquidated Damages and is placed on notice pursuant to this Article 9.9.1.5 that \$750 is due for each day of Punch List that exceeds sixty (60) days at \$750, a cost much lower than typical (and actual) costs for Inspection, Architect and Construction Manager time required during Punch List. Starting at ninety (90) days of Punch List (an excessive number of days to complete Punch List), the District shall be entitled to adjust Punch List Liquidated Damages to an estimate of the actual costs incurred to oversee, monitor and inspect the Punch List. If costs exceed \$750 per day, the anticipated extended contract charges for Inspection, Architect, Construction Manager, and any other costs that will be incurred due to the extended Punch List shall be itemized and a daily rate of Punch List Liquidated Damages shall be presented in writing to the Contractor within five (5) days following the receipt of a written request for Punch List Time Extension by the Contractor that extends the Punch List time beyond ninety (90) days. This written notice of actual Punch List Liquidated Damages may be provided to the Contractor at any time following the first written request for Punch List Time extension requested under Article 9.9.1.3. The adjusted actual Punch List Liquidated Damage amount shall be applicable as Punch List Liquidated Damages commencing on the ninetieth (90th) day of Punch List.

9.9.2 Close-Out Requirements for Final Completion of the Project

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- a. Utility Connections. Buildings shall be connected to water, gas, sewer, and electric services, complete and ready for use. Service connections shall be made and existing services reconnected
- b. As-Builts Up to Date and Complete. The intent of this procedure is to obtain an exact “As-Built” record of the Work upon completion of the project. The following information shall be carefully and correctly drawn on the prints and all items shall be accurately located and dimensioned from finished surfaces of building walls on all As-Built Drawings
 - 1. The exact location and elevations of all covered utilities, including valves, cleanouts, etc. must be shown on As-Built Drawings
 - 2. Contractor is liable and responsible for inaccuracies in As-Built Drawings, even though they become evident at some future date.
 - 3. Upon completion of the Work and as a condition precedent to approval of Retention Payment, Contractor shall obtain the Inspector’s approval of the “As-Built” information. When completed and approved, Contractor shall deliver one (1) half size hard copy set of the drawings and two (2) electronic flash drive copies of the drawings to the District.
 - 4. District may withhold the cost to hire a draftsman and potholing and testing service to complete Record As-Built Drawings at substantial cost if the Contractor does not deliver a complete set of Record As-Built Drawings. This shall result in withholding of between \$10,000 to \$20,000 per building that does not have a corresponding Record As Built Drawing.
- c. Any Work not installed as originally indicated on Drawings
- d. All DSA Close-Out requirements (See DSA Certification Guide) Contractor is also specifically directed to Item 3.2 in the DSA Certification Guide and the applicable certificates for the DSA-311 form.
- e. Submission of Form 6-C. Contractor shall be required to execute a Form 6-C as required under Title 24 Sections 4-343. The Contractor understands that the filing with DSA of a Form 6-C is a requirement to obtain final DSA Approval of the construction by Contractor and utilized to verify under penalty of perjury that the Work performed by Contractor complies with the DSA approved Contract Documents. The failure to file a DSA Form 6C has two consequences. First, the Construction of the Project will not comply with the design immunity provisions of Government Code section 830.6 and exposes the District and the individual Board members to personal liability for injuries that occur on the Project.

Secondly , under DSA IR A-20, since the Project cannot be Certified by DSA, no future or further Projects will be authorized so Contractor will have essentially condemned the campus from any future modernization or addition of new classrooms through their failure to file the DSA Form 6C.

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1. *Execution of the DSA Form 6-C is Mandatory.* Refusal to execute the Form 6-C, which is a Final DSA Verified Report that all Work performed complies with the DSA approved Contract Documents is a violation of Education Code section 17312 and shall be referred to the Attorney General for Prosecution.
 2. *Referral to the District Attorney for Extortion.* If the Contractor's refusal to execute the DSA Form 6C is to leverage a Dispute, Claim or litigation, then the matter shall also be referred to the District Attorney for prosecution for extortion.
 3. *Contractor shall be Responsible for All Costs to Certify the Project.* The District may certify the Project complies with Approved Plans and Specifications by utilizing the procedures under the Project Certification Guide (located at the DSA website). All costs for professionals, inspection, and testing required for an alternate Project Certification shall be the Contractor's responsibility and the District reserves its right to institute legal action against the Contractor and Contractor's Surety for all costs to certify the Project and all costs to correct Non-Compliant Work that is discovered during the Alternate Certification Process.
- f. ADA Work that must be corrected to receive DSA certification. See Article 12.2.
- g. Maintenance Manuals. At least thirty (30) days prior to final inspection, one (1) copy of complete operations and maintenance manuals, repair parts lists, service instructions for all electrical and mechanical equipment, and equipment warranties shall be submitted. All installation, operating, and maintenance information and Drawings shall be bound in 8½" x 11" binders. Provide a table of contents in front and all items shall be indexed with tabs. Each manual shall also contain a list of Subcontractors, with their addresses and the names of persons to contact in cases of emergency. Identifying labels shall provide names of manufactures, their addresses, ratings, and capacities of equipment and machinery.
1. Maintenance manuals shall also be delivered to the District on two (2) electronic flash drive copies.
- h. Inspection Requirements. Before calling for final inspection, Contractor shall determine that the following Work has been performed:
1. The Work has been completed;
 2. All fire/ life safety items are completed and in working order;
 3. Mechanical and electrical Work complete, fixtures in place, connected and tested;
 4. Electrical circuits scheduled in panels and disconnect switches labeled;
 5. Painting and special finishes complete;

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6. Doors complete with hardware, cleaned of protective film relieved of sticking or binding and in working order;
7. Tops and bottoms of doors sealed;
8. Floors waxed and polished as specified;
9. Broken glass replaced and glass cleaned;
10. Grounds cleared of Contractor's equipment, raked clean of debris, and trash removed from Site;
11. Work cleaned, free of stains, scratches, and other foreign matter, replacement of damaged and broken material;
12. Finished and decorative work shall have marks, dirt and superfluous labels removed;
13. Final cleanup, as in Article 3.12;
14. All Work pursuant to Article 9.11.2; and
15. Furnish a letter to District stating that the District's Representative or other designated person or persons have been instructed in working characteristics of mechanical and electrical equipment.

i. **Training Requirements.**

1. The Contractor is required to video record all training and demonstrations required by the specifications.
2. Video quality shall be 720p or greater.
3. At completion of all required trainings, Contractor to combine and organize by spec section onto two (2) electronic flash drive copies and turnover to the District.

9.9.3 **Costs of Multiple Inspections**

More than two (2) requests of the District to make inspections required under Article 9.9.1 shall be considered an additional service of Architect, Inspector, Engineer or other consultants shall be the Contractor's responsibility pursuant to Article 4.5 and all subsequent costs will be prepared as a Deductive Change Order.

9.10 PARTIAL OCCUPANCY OR USE

9.10.1 **District's Rights**

The District may occupy or use any completed or partially completed portion of the Work at any stage. The District and the Contractor shall agree in writing to the responsibilities assigned to each

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of them for payments, security, maintenance, heat, utilities, damage to the Work, insurance, the period for correction of the Work, and the commencement of warranties required by the Contract Documents. If District and Contractor cannot agree as to responsibilities such disagreement shall be resolved pursuant to Article 4.6. When the Contractor considers a portion complete, the Contractor shall prepare and submit a Punch List to the District as provided under Article 9.9.1.

9.10.2 Inspection Prior to Occupancy or Use

Immediately prior to such partial occupancy or use, the District, the Contractor, and the Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

9.10.3 No Waiver

Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

9.11 COMPLETION AND FINAL PAYMENT

9.11.1 Final Payment (90% Billing if Substantially Complex Finding and 95% Billing If No Finding Is Made)

The following items must be completed before the Final Payment Application will be accepted for processing at Substantial Completion of the Project:

- a. Inspector sign-off of each item in the DSA 152 Project Inspection Card;
- b. The Project has reached the Punch List items under Article 9.9.1.2 and the Project has been determined to be Substantially Complete under Article 1.1.46;
- c. Removal of temporary facilities and services;
- d. Testing, adjusting and balance records are complete;
- e. Removal of surplus materials, rubbish, and similar elements;
- f. Changeover of door locks;
- g. Deductive items pursuant to Article 9.6 and Article 2.2; and
- h. Completion and submission of all final Change Orders for the Project.

9.11.2 Final Inspection (Punch List Completion)

Contractor shall comply with Punch List procedures under Article 9.9.1.1, and maintain the presence of Project Superintendent and Project Manager (not replacement project superintendent or project manager) until the Punch List is complete to ensure proper and timely completion of the Punch List. Under no circumstances shall Contractor demobilize its forces prior to completion of the Punch List.

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Upon completion of the Work under Article 9.9.1, the Contractor shall notify the District and Architect, who shall again inspect such Work. If the Architect and the District find the Work contained in the Punch List acceptable under the Contract Documents, the Work shall have reached Final Completion. Architect shall notify Contractor, who shall then submit to the Architect its Application for Retention Payment. This Application for Retention Payment shall contain any deductions under Article 9.6, including but not limited to incomplete Punch List items under Article 9.9.1.

Upon receipt and approval of Application for Retention Payment, the Architect shall issue a Form 6 stating that to the best of its knowledge, information, and belief, and on the basis of its observations, inspections, and all other data accumulated or received by the Architect in connection with the Work, such Work has been completed in accordance with the Contract Documents. The District shall thereupon inspect such Work and either accept the Work as complete or notify the Architect and the Contractor in writing of reasons why the Work is not complete. Upon acceptance of the Work of the Contractor as fully complete (which, absent unusual circumstances, will occur when the Punch List items have been satisfactorily completed), the District shall record a Notice of Completion with the County Recorder, and the Contractor shall, upon receipt of payment from the District, pay the amounts due Subcontractors.

If the Architect and the District find that the Work contained in the Punch List is unacceptable, then Contractor shall issue a valued Punch List within 5 days after the date the Punch List time ends. If Contractor does not issue such a list, the District or Architect may issue a valued Punch List to the Contractor and withhold up to 150% of the value of the Punch List Work pursuant to Article 2.2 of this Agreement.

9.11.3 Retainage (100% Billing for the Entire Project)

The retainage, less any amounts disputed by the District or which the District has the right to withhold pursuant to the Contract Documents (including but not limited to incomplete Punch List items under Article 9.9.1), shall be paid after approval by the District of the Application for Retention Payment, after the satisfaction of the conditions set forth in Article 9, the Final Inspection under Article 9.11.2 is completed, and after thirty-five (35) days after the acceptance of the Work and recording of the Notice of Completion by District. No interest shall be paid on any retainage, or on any amounts withheld due to a failure of the Contractor to perform, in accordance with the terms and conditions of the Contract Documents, except as provided to the contrary in any escrow agreement between the District and the Contractor.

- a. Procedures for Application for Retention Payment. The following conditions must be fulfilled prior to release of Retention Payment:
 1. A full and final waiver or release of all stop notices in connection with the Work shall be submitted by Contractor, including a release of stop notice in recordable form, together with (to the extent permitted by law) a copy of the full and final release of all Stop Notice rights.
 2. The Contractor shall have made all corrections, including all Punch List Items, to the Work which are required to remedy any defects therein, to obtain compliance with the Contract Documents or any requirements of applicable codes and

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ordinances, or to fulfill any of the orders or directions of District required under the Contract Documents.

3. Each Subcontractor shall have delivered to the Contractor all written guarantees, warranties, applications, releases from the Surety and warranty bonds (if applicable) required by the Contract Documents for its portion of the Work.
4. Contractor must have completed all requirements set forth in Article 9.9
5. Contractor must have issued a Form 6C for the Project.
6. The Contractor shall have delivered to the District all manuals and materials required by the Contract Documents.
7. The Contractor shall have completed final clean up as required by Article 3.12
8. Contractor shall have all deductive items under Article 9.6 and Article 2.2 submitted as part of the Retention Payment.

9.11.4 Recording of a Notice of Completion After Punch List Period and Final Inspection.

When the Work, or designated portion thereof, is complete or the District has completed the Article 9.6 and/or the Article 2.2 process, whichever occurs first, the District will file either a Notice of Completion or a Notice of Completion noting valued Punch List items. Valued Punch List items will be deducted from the Retention Payment.

During the time when Work is being performed on the Punch List, the Project does not meet the definition of "Complete" under Public Contract Code section 7107(c)(1) even if there is "beneficial occupancy" of the Project since that has been no "cessation of labor" on the Project. Completion of Punch List under this Article is not "testing, startup, or commissioning by the public entity or its agent." In other words, the continuing Punch List Work is Contractor labor on the Project until each and every item of Punch List Work is complete or the time periods under Article 9.9.1 have expired.

9.11.5 Warranties

Warranties required by the Contract Documents shall commence on the date of Completion of the entire Work. Warranty periods DO NOT commence at Substantial Completion or when a particular Subcontractor work is complete. No additional charges, extras, Change Orders, or Claims may be sought for warranties commencing from the Notice of Completion.

District shall have the right to utilize equipment, test, and operate as necessary for acclimation, or testing without voiding or starting warranties. Taking beneficial occupancy shall not start warranties except in the case where the District agrees, in writing, that warranties shall commence running or where the District is taking phased occupancy of specific buildings or areas and completes separate Punch Lists as further addressed in Article 4.2.7.

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9.11.6 Time for Submission of Application for Final Payment and Retention Payment (Unilateral Processing of Final and Retention Payment Application).

If Contractor submits a Final Payment Application which fails to include deductive items under Article 9.6, the District or Architect shall note this defective request for Final Payment Application. The Contractor shall be notified that specific deductive items shall be included in the Final Payment Application. If Contractor either continues to submit the Final Payment Application without deductive items under Article 9.6, or a period of 14 calendar days passes after Contractor is provided written notice of deductive items for inclusion in Final Payment Application, then District may either alter the Final Payment Application and recalculate the math on the Final Payment Application to address the Article 9.6 deductive items or process a unilateral Final Payment Application.

9.11.7 Unilateral Release of Retention

After the recordation of the Notice of Completion, or within sixty (60) days following the completion of the Punch List or the expiration of the time for completion of Punch List under Article 9.9.1, if Contractor does not make an Application for Release of Retention, the District may unilaterally release retention less any deducts under Article 9.6 and/or Article 2.2, withholds due to stop notices, or withholdings due to other defective Work on the Project. District may also choose to unilaterally release Retention after deduction of 150% of any disputed items, which may also include items under Article 9.6 and 2.2. If a deduction pursuant to Article 9.6 is made from Retention, a letter deducting specific valued items shall be considered a notice of Default under the terms of the Escrow Agreement.

9.12 SUBSTITUTION OF SECURITIES

The District will permit the substitution of securities in accordance with the provisions of Public Contract Code section 22300 as set forth in the form contained in the Bid Documents.

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ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

10.1.1 Contractor Responsibility

The Contractor shall be responsible for all damages to persons or property that occur as a result of its fault or negligence in connection with the prosecution of this Contract and shall take all necessary measures and 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, with the exception of damage to the Work caused by "acts of God" as defined in Public Contract Code section 7105(b)(2).

Contractor shall take, and require Subcontractor to take, all necessary precautions for safety of workers on the Work and shall comply with all applicable federal, state, local and other safety laws, standards, orders, rules, regulations, and building codes to prevent accidents or injury to persons on, about, or adjacent to premises where Work is being performed and to provide a safe and healthful place of employment. In addition to meeting all requirements of OSHA, Cal-OSHA, state, and local codes, Contractor shall furnish, erect and properly maintain at all times, as directed by District or Architect or required by conditions and progress of Work, all necessary safety devices, safeguards, construction canopies, signs, audible devices for protection of the blind, safety rails, belts and nets, barriers, lights, and watchmen for protection of workers and the public, and shall post danger signs warning against hazards created by such features in the course of construction. Contractor shall designate a responsible member of its organization on the Work, whose duty shall be to post information regarding protection and obligations of workers and other notices required under occupational safety and health laws, to comply with reporting and other occupational safety requirements, and to protect the life, safety and health of workers. The name and position of person so designated shall be reported to District by Contractor. Contractor shall correct any violations of safety laws, rules, orders, standards, or regulations. Upon the issuance of a citation or notice of violation by the Division of Occupational Safety and Health, such violation shall be corrected promptly.

10.1.2 Subcontractor Responsibility

Contractor shall require that Subcontractors participate in, and enforce, the safety and loss prevention programs established by the Contractor for the Project, which will cover all Work performed by the Contractor and its Subcontractors. Each Subcontractor shall designate a responsible member of its organization whose duties shall include loss and accident prevention, and who shall have the responsibility and full authority to enforce the program. This person shall attend meetings with the representatives of the various Subcontractors employed to ensure that all employees understand and comply with the programs.

10.1.3 Cooperation

All Subcontractors and material or equipment suppliers shall cooperate fully with Contractor, the District, and all insurance carriers and loss prevention engineers.

10.1.4 Accident Reports

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Subcontractors shall immediately, within two (2) days, report in writing to the Contractor all accidents whatsoever arising out of, or in connection with, the performance of the Work, whether on or off the Site, which caused death, personal injury, or property damage, giving full details and statements of witnesses. In addition, if death or serious injuries or serious damages are caused, the accident shall be reported within four (4) days by telephone or messenger. Contractor shall thereafter immediately, within two (2) days, report the facts in writing to the District and the Architect giving full details of the accident.

10.1.5 First-Aid Supplies at Site

The Contractor will provide and maintain at the Site first-aid supplies which complies with the current Occupational Safety and Health Regulations.

10.1.6 Material Safety Data Sheets and Compliance with Proposition 65

Contractor is required to have material safety data sheets available in a readily accessible place at the job site for any material requiring a material safety data sheet per the Federal "hazard communication" standard, or employees' "right-to-know law." The Contractor is also required to properly label any substance brought into the job site, and require that any person working with the material, or within the general area of the material, is informed of the hazards of the substance and follows proper handling and protection procedures.

Contractor is required to comply with the provisions of California Health and Safety Code section 25249, et seq., which requires the posting and giving of notice to persons who may be exposed to any chemical known to the State of California to cause cancer. The Contractor agrees to familiarize itself with the provisions of this Section, and to comply fully with its requirements.

10.1.7 Non-Utilization of Asbestos Material

NO ASBESTOS OR ASBESTOS-CONTAINING PRODUCTS SHALL BE USED IN THIS CONSTRUCTION OR IN ANY TOOLS, DEVICES, CLOTHING, OR EQUIPMENT USED TO EFFECT THIS CONSTRUCTION.

Asbestos and/or asbestos-containing products shall be defined as all items containing, but not limited to, chrysotile, amosite, anthophyllite, tremolite, and antinolite.

Any or all material containing greater than one-tenth of one percent (>.1%) asbestos shall be defined as asbestos-containing material.

All Work or materials found to contain asbestos or Work or material installed with asbestos-containing equipment will be immediately rejected and this Work will be removed 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.

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The asbestos consultant shall be chosen and approved by the District, who shall have sole discretion and final determination in this matter.

The Work will not be accepted until asbestos contamination is reduced to levels deemed acceptable by the asbestos consultant.

Interface of Work under this Contract with Work containing asbestos shall be executed by the Contractor at his risk and at his discretion, with full knowledge of the currently accepted standards, hazards, risks, and liabilities associated with asbestos work and asbestos-containing products. By execution of this Contract, the Contractor acknowledges the above and agrees to hold harmless District and its assigns for all asbestos liability which may be associated with this work and agrees to instruct his employees with respect to the above-mentioned standards, hazards, risks, and liabilities.

10.2 SAFETY OF PERSONS AND PROPERTY

10.2.1 The Contractor

The Contractor shall take reasonable precautions for the safety of, and shall provide reasonable protection to prevent damage, injury, or loss to:

- a. Employees on the Work and other persons who may be affected thereby;
- b. The Work, material, and equipment to be incorporated therein, whether in storage on or off the Site, under the care, custody, or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- c. Other property at the Site or adjacent thereto such as trees, shrubs, lawns, walks, pavement, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

Contractor is constructive owner of Project site as more fully discussed in Article 6.2.

10.2.2 Contractor Notices

The Contractor shall give notices and comply with applicable laws, ordinances, rules, regulations, and lawful orders of public authorities bearing on the safety of persons or property or their protection from damage, injury, or loss.

10.2.3 Safety Barriers and Safeguards

The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations, and notifying owners and users of adjacent sites and utilities.

10.2.4 Use or Storage of Hazardous Material

When use or storage of explosives, other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel. The Contractor shall notify the District

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any time that explosives or hazardous materials are expected to be stored on Site. Location of storage shall be coordinated with the District and local fire authorities.

10.2.5 Protection of Work

The Contractor and Subcontractors shall continuously protect the Work, the District's property, and the property of others, from damage, injury, or loss arising in connection with operations under the Contract Documents. The Contractor and Subcontractors, at their own expense, shall make good any such damage, injury, or loss, except such as may be solely due to, or caused by, agents or employees of the District.

The Contractor, at Contractor's expense, will remove all mud, water, or other elements as may be required for the proper protection and prosecution of its Work.

Contractor shall take adequate precautions to protect existing roads, sidewalks, curbs, pavements, utilities, adjoining property and structures (including, without limitation, protection from settlement or loss of lateral support), and to avoid damage thereto, and repair any damage thereto caused by construction operations. All permits, licenses, or inspection fees required for such repair Work shall be obtained and paid for by Contractor.

10.2.6 Requirements for Existing Sites

Contractor shall (unless waived by the District in writing):

- a. When performing construction on existing sites, become informed and take into specific account the maturity of the students on the Site; and perform Work which may interfere with school routine before or after school hours, enclose working area with a substantial barricade, and arrange Work to cause a minimum amount of inconvenience and danger to students and faculty in their regular school activities. The Contractor shall comply with Specifications and directives of the District regarding the timing of certain construction activities in order to avoid unnecessary interference with school functioning.
- b. Avoid performing any Work that will disturb students during testing.
- c. Provide substantial barricades around any shrubs or trees indicated to be preserved.
- d. Deliver materials to building area over route designated by Architect.
- e. Take preventive measures to eliminate objectionable dust, noise, or other disturbances.
- f. Confine apparatus, the storage of materials, and the operations of workers to limits indicated by law, ordinances, permits or directions of Architect; and not interfere with the Work or unreasonably encumber premises or overload any structure with materials; and enforce all instructions of District and Architect regarding signs, advertising, fires, and smoking and require that all workers comply with all regulations while on the Project site.

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- g. 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 land surveyor or civil engineer and all maps and records required therefrom shall be filed with county and local authorities, at no cost to the District. All filing and plan check fees shall be paid by Contractor.
- h. Provide District on request with Contractor's written safety program and safety plan for each site.

10.2.7 Shoring and Structural Loading

The Contractor shall not impose structural loading upon any part of the Work under construction or upon existing construction on or adjacent to the Site in excess of safe limits, or loading such as to result in damage to the structural, architectural, mechanical, electrical, or other components of the Work. The design of all temporary construction equipment and appliances used in construction of the Work and not a permanent part thereof, including, without limitation, hoisting equipment, cribbing, shoring, and temporary bracing of structural steel, is the sole responsibility of the Contractor. All such items shall conform with the requirements of governing codes and all laws, ordinances, rules, regulations, and orders of all authorities having jurisdiction. The Contractor shall take special precautions, such as shoring of masonry walls and temporary tie bracing of structural steel Work, to prevent possible wind damage during construction of the Work. The installation of such bracing or shoring shall not damage the Work in place or the Work installed by others. Any damage which does occur shall be promptly repaired by the Contractor at no cost to the District.

10.2.8 Conformance within Established Limits

The Contractor and Subcontractors shall confine their construction equipment, the storage of materials, and the operations of workers to the limits indicated by laws, ordinances, permits, and the limits established by the District or the Contractor, and shall not unreasonably encumber the premises with construction equipment or materials.

10.2.9 Subcontractor Enforcement of Rules

Subcontractors shall enforce the District's and the Contractor's instructions, laws, and regulations regarding signs, advertisements, fires, smoking, the presence of liquor, and the presence of firearms by any person at the Site.

10.2.10 Site Access

The Contractor and the Subcontractors shall use only those ingress and egress routes designated by the District, observe the boundaries of the Site designated by the District, park only in those areas designated by the District, which areas may be on or off the Site, and comply with any parking control program established by the District, such as furnishing license plate information and placing identifying stickers on vehicles.

10.2.11 Security Services.

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The Contractor shall be responsible for providing security services for the Site as needed for the protection of the Site and as determined in the District's sole discretion.

10.3 EMERGENCIES

10.3.1 Emergency Action

In an emergency affecting the safety of persons or property, the Contractor shall take any action necessary, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 7.

10.3.2 Accident Reports

The Contractor shall promptly report in writing to the District all accidents arising out of or in connection with the Work, which caused death, personal injury, or property damage, giving full details and statements of any witnesses in conformance with Article 10.1.4. In addition, if death, serious personal injuries, or serious property damages are caused, the accident shall be reported in accordance with Article 10.1.4, immediately by telephone or messenger to the District.

10.4 HAZARDOUS MATERIALS

10.4.1 Discovery of Hazardous Materials

In the event the Contractor encounters or suspects the presence on the job site of material reasonably believed to be asbestos, polychlorinated biphenyl (PCB), or any other material defined as being hazardous by § 25249.5 of the California Health and Safety Code, which has not been rendered harmless, the Contractor shall immediately stop Work in the area affected and report the condition to the District and the Architect in writing, whether or not such material was generated by the Contractor or the District. The Work in the affected area shall not thereafter be resumed, except by written agreement of the District and the Contractor, if in fact the material is asbestos, polychlorinated biphenyl (PCB), or other hazardous material, and has not been rendered harmless. The Work in the affected area shall be resumed only in the absence of asbestos, polychlorinated biphenyl (PCB), or other hazardous material, or when it has been rendered harmless by written agreement of the District and the Contractor.

10.4.2 Hazardous Material Work Limitations

In the event that the presence of hazardous materials is suspected or discovered on the Site (except in cases where asbestos and other hazardous material Work in the Contractor's responsibility), the District shall retain an independent testing laboratory to determine the nature of the material encountered and whether corrective measures or remedial action is required. The Contractor shall not be required pursuant to Article 7 to perform without consent any Work in the affected area of the Site relating to asbestos, polychlorinated biphenyl (PCB), or other hazardous material, until any known or suspected hazardous material has been removed, or rendered harmless, or determined to be harmless by District, as certified by an independent testing laboratory and approved by the appropriate government agency.

10.4.3 Indemnification by Contractor for Hazardous Material Caused by Contractor

In the event the hazardous materials on the Project Site is caused by the Contractor, the Contractor shall pay for all costs of testing and remediation, if any, and shall compensate the District for

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any additional costs incurred as a result of Contractor's generation of hazardous material on the Project Site. In addition, the Contractor shall defend, indemnify and hold harmless District and its agents, officers, and employees from and against any and all claims, damages, losses, costs and expenses incurred in connection with, arising out of, or relating to, the presence of hazardous material on the Project Site.

10.4.4 Terms of Hazardous Material Provision

The terms of this Hazardous Material provision shall survive the completion of the Work and/or any termination of this Contract.

10.5 SITE SAFETY PLAN

10.5.1 Requirements

A condition precedent of receiving the Notice to Proceed (NTP), the Contractor must submit to the District a Site Safety Plan (SSP) in compliance with DSA Bulletin BU 24-05. At a minimum, the SSP shall include the following information required in California Fire Code (CFC) Section 3303.1.1

- Name and contact information of site safety director.
- Documentation of training of the site safety director and fire watch personnel.
- Procedures for reporting emergencies.
- Fire department vehicle access routes.
- Locations of fire protection equipment, including portable fire extinguishers, standpipes, fire department connections and fire hydrants.
- Smoking and cooking policies, designated areas to be used where approved, and signage locations in accordance with CFC Section 3305.8.
- Location and safety considerations for temporary heating equipment.
- Hot work (welding, roofing, etc.) plan.
- Plans for control of combustible waste.
- Locations and methods for storage and use of flammable and combustible liquids and other hazardous materials.
- Provisions of site security.
- Changes that affect this plan.
- Other site-specific information requested by the local fire authority (LFA).

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ARTICLE 11 INSURANCE AND BONDS

11.1 CONTRACTOR'S LIABILITY INSURANCE

Refer to EXHIBIT A: Owner Controlled Insurance Program (OCIP)

11.2 WORKERS' COMPENSATION INSURANCE

Refer to EXHIBIT A: Owner Controlled Insurance Program (OCIP)

11.3 BUILDER'S RISK/ "ALL RISK" INSURANCE

Refer to EXHIBIT A: Owner Controlled Insurance Program (OCIP)

11.4 FIRE INSURANCE

Refer to EXHIBIT A: Owner Controlled Insurance Program (OCIP)

11.5 AUTOMOBILE LIABILITY

Refer to EXHIBIT A: Owner Controlled Insurance Program (OCIP)

11.6 OTHER INSURANCE

Refer to EXHIBIT A: Owner Controlled Insurance Program (OCIP)

11.7 PROOF OF INSURANCE

Refer to EXHIBIT A: Owner Controlled Insurance Program (OCIP)

11.8 COMPLIANCE

Refer to EXHIBIT A: Owner Controlled Insurance Program (OCIP)

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11.9 WAIVER OF SUBROGATION

Refer to EXHIBIT A: Owner Controlled Insurance Program (OCIP)

11.10 PERFORMANCE AND PAYMENT BONDS

11.10.1 Bond Requirements

Unless otherwise specified in the Supplemental Conditions, prior to commencing any portion of the Work, the Contractor shall furnish separate Payment and Performance Bonds for its portion of the Work which shall cover 100% faithful performance of and payment of all obligations arising under the Contract Documents and/or guaranteeing the payment in full of all claims for labor performed and materials supplied for the Work. All bonds shall be provided by a corporate Surety authorized and admitted to transact business in California as sureties.

To the extent, if any, that the Contract Price is increased in accordance with the Contract Documents, the Contractor shall, upon request of the District, cause the amount of the bonds to be increased accordingly and shall promptly deliver satisfactory evidence of such increase to the District. To the extent available, the bonds shall further provide that no change or alteration of the Contract Documents (including, without limitation, an increase in the Contract Price, as referred to above), extensions of time, or modifications of the time, terms, or conditions of payment to the Contractor will release the Surety. If the Contractor fails to furnish the required bonds, the District may terminate the Contract for cause.

11.10.2 Surety Qualification

Only bonds executed by admitted Surety insurers as defined in Code of Civil Procedure § 995.120 shall be accepted. Surety must be a California-admitted Surety and listed by the U.S. Treasury with a bonding capacity in excess of the Project cost.

11.10.3 Alternate Surety Qualifications

If a California-admitted Surety insurer issuing bonds does not meet these requirements, the insurer will be considered qualified if it is in conformance with § 995.660 of the California Code of Civil Procedure and proof of such is provided to the District.

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ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

12.1 COMPLIANCE WITH TITLE 24 INSTALLATION REQUIREMENTS

Contractor is aware of the requirements governing Contractor's Work under title 24 Section 4-343 which provides, in pertinent part:

4-343. Duties of the Contractor.

(a) **Responsibilities.** It is the duty of the contractor to complete the Work covered by his or her contract in accordance with the approved Plans and Specifications therefore. The contractor in no way is relieved of any responsibility by the activities of the architect, engineer, Inspector or DSA in the performance of such duties.

(b) **Performance of the Work.** The contractor shall carefully study the approved Plans and Specifications and shall plan a schedule of operations well ahead of time. If at any time it is discovered that Work is being done which is not in accordance with the approved Plans and Specifications, the contractor shall correct the Work immediately. All inconsistencies or items which appear to be in error in the Plans and Specifications shall be promptly called to the attention of the architect or registered engineer, through the Inspector, for interpretation or correction. In no case, however, shall the instruction of the architect or registered engineer be construed to cause Work to be done which is not in conformity with the approved Plans, Specifications, and Change Orders. The contractor must notify the Project Inspector, in advance, of the commencement of construction of each and every aspect of the Work.

12.1.1 Issuance of Notices of Non-Compliance

The Inspector may issue a Notice of Non-Compliance on the Project indicating deviation from Plans and Specifications. It is Contractor's responsibility to correct all deviations from the approved Plans and Specifications unless the District has issued an Immediate Change Directive. In such case, the Contractor shall proceed with the Work with the understandings of the District as set forth in the ICD and as specifically noted in Article 7.3.

12.2 SPECIAL NOTICE OF AMERICAN'S WITH DISABILITIES ACT

Some of the requirements in the Plans and Specifications are meant to comply with the Americans with Disabilities Act ("ADA"). The requirements of the ADA are technical in nature and may appear to be minor in nature (i.e. whether a walkway or ramp has a 2% cross-slope). Contractor is warned that even the slightest deviation from the specific requirements from the ADA is considered a Civil Rights violation and subjects the District to fines of three times actual damages sustained by a handicap individual or up to \$4,000 per violation and attorney's fees required to enforce the ADA violation. As a result of the significant liability and exposure associated with ADA aspects of the Contract, Contractor shall take special care to meet all ADA requirements detailed in the Plans and Specifications. Failure to comply with ADA rules that results in a Notice of Non-Compliance shall be repaired to meet ADA requirements promptly. In addition, any ADA violations that are not identified by Inspector or Architect that are later identified shall be repaired and charged back to the Contractor through a Deductive Change Order.

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12.2.1 Indemnification of ADA Claims

Contractor shall indemnify, hold harmless and defend the District from ADA claims arising from the failure to comply with the Plans and Specifications. Further, any withholdings for ADA violations under Article 9.6 shall include potential redesign costs and an accelerated repair costs due to the potential for ADA claims arising from DSA posting of ADA violations on the Project.

12.3 UNCOVERING OF WORK

12.3.1 Uncovering Work for Required Inspections

Work shall not be covered without the Inspector's review and the Architect's knowledge that the Work conforms with the requirements of the approved Plans and Specifications (except in the case of an ICD under Article 7.3). Inspector must be timely notified of inspections and of new areas so Work can be inspected at least 48 hours before opening a new area (For example, see DSA Form 156 for Commencement/Completion of Work Notification which requires "at least 48 hour" advance notification of a new area). An Inspector must comply with DSA protocols for signing each category or phase of Work under DSA Form 152 (in compliance with the Form 152 Manual) or a Notice of Deviation (DSA Form 154) will be issued requiring the Work that was not inspected be uncovered for inspection. Thus, if a portion of the Work is covered without inspection or Architect approval, is subject to a Notice of Non-Compliance for being undertaken without inspection, or otherwise not in compliance with the Contract Documents, after issuance of a Written Notice of Non-Compliance (Form 154) or a written notice to uncover Work, Contractor shall promptly uncover all Work (which includes furnishing all necessary facilities, labor, and material) for the Inspector's or the Architect's observation and such Work shall be replaced at the Contractor's expense without change in the Contract Sum or Time.

12.3.2 Costs for Inspections Not Required

If a portion of the Work has been covered is believed to be Non-Conforming to the Plans and Specifications, even if the Form 152 for the category of Work has been signed by the Inspector, the Inspector or the Architect may request to see such Work, and it shall be promptly uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncover and replacement shall, by appropriate Change Order and shall, be charged to the District. If such Work is not in accordance with Contract Documents, the Contractor shall be responsible for all costs to uncover the Work, delays incurred to uncover the Work, and Contractor shall pay all costs to correct the Non-Conforming construction condition unless the condition was caused by the District or a separate contractor, in which event the District shall be responsible for payment of such costs to the Contractor.

12.4 CORRECTION OF WORK

12.4.1 Correction of Rejected Work

The Contractor shall promptly correct the Work rejected by the Inspector or the District upon recommendation of the Architect as failing to conform to the requirements of the Contract Documents, whether observed before or after Completion and whether or not Fabricated, installed, or completed. The Contractor shall bear costs of correcting the rejected Work, including cost for delays that may be incurred by Contractor or Subcontractors, the cost for additional testing, inspections, and compensation for the Inspector's or the Architect's services and expenses made necessary thereby (including costs for preparing a CCD, DSA CCD review fees, and additional inspection and special inspection costs).

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12.4.2 One-Year Warranty Corrections

If, within one (1) year after the date of Completion of the Work or a designated portion thereof, or after the date for commencement of warranties established under Article 9.9.1, or by the terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the District to do so unless the District has previously given the Contractor a written acceptance of such condition. This period of one (1) year shall be extended with respect to portions of the Work first performed after Completion by the period of time between Completion and the actual performance of the Work. This obligation under this Article 12.4.2 shall survive acceptance of the Work under the Contract and termination of the Contract. The District shall give such notice promptly after discovery of the condition.

12.4.3 District's Rights if Contractor Fails to Correct

If the Contractor fails to correct nonconforming Work within a reasonable time, the District may correct the Work and seek a Deductive Change Order, pursuant to Article 9.6 or Article 2.2.

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ARTICLE 13 MISCELLANEOUS PROVISIONS

13.1 GOVERNING LAW

The Contract shall be governed by the law of the place where the Project is located.

13.2 SUCCESSORS AND ASSIGNS

The District and the Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to the other party hereto and to partners, successors, assigns, and legal representatives of such other party in respect to covenants, agreements, and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

13.3 WRITTEN NOTICE

In the absence of specific notice requirements in the Contract Documents, written notice shall be deemed to have been duly served if delivered in person to the individual, member of the firm or entity, or to an officer of the corporation for which it was intended, or if delivered at or sent by registered or certified mail to the last business address known to the party giving notice.

13.4 RIGHTS AND REMEDIES

13.4.1 Duties and Obligations Cumulative

Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

13.4.2 No Waiver

No action or failure to act by the Inspector, the District, or the Architect shall constitute a waiver of a right or duty afforded them under the Contract Documents, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

13.5 TESTS AND INSPECTIONS

13.5.1 Compliance

Tests, inspections, and approvals of portions of the Work required by the Contract Documents will comply with Division 1, Title 24, and with all other laws, ordinances, rules, regulations, or orders of public authorities having jurisdiction.

13.5.2 Independent Testing Laboratory

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The District will select and pay an independent testing laboratory to conduct all tests and inspections. Selection of the materials required to be tested shall be made by the laboratory or the District's representative and not by the Contractor. See Articles 3.13.1 and 4.3.6 regarding costs or expenses of inspection or testing outside of the Project Site.

13.5.3 Advance Notice to Inspector

The Contractor shall notify the Inspector a sufficient time in advance of its readiness for required observation or inspection so that the Inspector may arrange for same. The Contractor shall notify the Inspector a sufficient time in advance of the manufacture of material to be supplied under the Contract Documents which must, by terms of the Contract Documents, be tested in order that the Inspector may arrange for the testing of the material at the source of supply.

13.5.4 Testing Off-Site

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 Inspector that such testing and inspection will not be required, shall not be incorporated in the Work.

13.5.5 Additional Testing or Inspection

If the Inspector, the Architect, the District, or public authority having jurisdiction determines that portions of the Work require additional testing, inspection, or approval not included under Article 13.5.1, the Inspector will, upon written authorization from the District, make arrangements for such additional testing, inspection, or approval. The District shall bear such costs except as provided in Articles 13.5.6 and 13.5.7.

13.5.6 Costs for Retesting

If such procedures for testing, inspection, or approval under Articles 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, the Contractor shall bear all costs arising from such failure, including those of re-testing, re-inspection, or re-approval, including, but not limited to, compensation for the Architect's services and expenses. Any such costs shall be paid by the District, invoiced to the Contractor, and deducted from the next Progress Payment.

13.5.7 Costs for Premature Test

In the event the Contractor requests any test or inspection for the Project and is not completely ready for the inspection, the Contractor shall be invoiced by the District for all costs and expenses resulting from that testing or inspection, including, but not limited to, the Inspector's and Architect's fees and expenses, and the amount of the invoice shall be deducted from the next Progress Payment.

13.6 TRENCH EXCAVATION

13.6.1 Trenches Greater Than Five Feet

Pursuant to Labor Code section 6705, if the Contract Price exceeds \$25,000 and involves the excavation of any trench or trenches five (5) feet or more in depth, the Contractor shall, in advance of

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excavation, submit to the District or a registered civil or structural engineer employed by the District or Architect, a detailed plan showing the design of shoring for protection from the hazard of caving ground during the excavation of such trench or trenches.

13.6.2 Excavation Safety

If such plan varies from the Shoring System Standards established by the Construction Safety Orders, the plan shall be prepared by a registered civil or structural engineer, but in no case shall such plan be less effective than that required by the Construction Safety Orders. No excavation of such trench or trenches shall be commenced until said plan has been accepted by the District or by the person to whom authority to accept has been delegated by the District.

13.6.3 No Tort Liability of District

Pursuant to Labor Code § 6705, nothing in this Article shall impose tort liability upon the District or any of its employees.

13.6.4 No Excavation without Permits

The Contractor shall not commence any excavation Work until it has secured all necessary permits including the required CAL OSHA excavation/shoring permit. Any permits shall be prominently displayed on the Site prior to the commencement of any excavation.

13.7 WAGE RATES, TRAVEL, AND SUBSISTENCE

13.7.1 Wage Rates

Pursuant to the provisions of Article 2 (commencing at § 1720), Chapter 1, Part 7, Division 2, of the Labor Code, the District has obtained the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work in the locality in which this public works project is to be performed for each craft, classification, or type of worker needed for this Project from the Director of the Department of Industrial Relations ("Director"). These rates are on file at the administrative office of the District and are also available from the Director of the Department of Industrial Relations. Copies will be made available to any interested party on request. The Contractor shall post a copy of such wage rates at appropriate, conspicuous, weatherproof points at the Site.

Any worker employed to perform Work on the Project, but such Work is not covered by any classification listed in the published general prevailing wage rate determinations or per diem wages determined by the Director of the Department of Industrial Relations, shall be paid not less than the minimum rate of wages specified therein for the classification which most nearly corresponds to the employment of such person in such classification.

13.7.2 Holiday and Overtime Pay

Holiday and overtime work, when permitted by law, shall be paid for at the rate set forth in the prevailing wage rate determinations issued by the Director of the Department of Industrial Relations or at least one and one-half (1½) times the specified basic rate of per diem wages, plus employer payments, unless otherwise specified in the Contract Documents or authorized by law.

13.7.3 Wage Rates Not Affected by Subcontracts

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The Contractor shall pay and shall cause to be paid each worker engaged in the execution of the Work on the Project not less than the general prevailing rate of per diem wages determined by the Director, regardless of any contractual relationship which may be alleged to exist between the Contractor or any Subcontractor and such workers.

13.7.4 Per Diem Wages

The Contractor shall pay and shall cause to be paid to each worker needed to execute the Work on the Project per diem wages including, but not limited to, employer payments for health and welfare, pensions, vacation, travel time and subsistence pay as provided for in Labor Code §1773.1.

13.7.5 Forfeiture and Payments

Pursuant to Labor Code §1775, the Contractor shall forfeit 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 prevailing wages rates as determined by the Director of the Department of Industrial Relations, for the work or craft in which the worker is employed for any Work done under the Agreement by the Contractor or by any Subcontractor under it. The amount of the penalty shall be determined by the Labor Commissioner and shall be based on consideration of: (1) whether the Contractor or Subcontractor's failure to pay the correct rate of per diem wages was a good faith mistake and, if so, the error was promptly and voluntarily corrected upon being brought to the attention of the Contractor or Subcontractor; and (2) whether the Contractor or Subcontractor has a prior record of failing to meet its prevailing wage obligations.

13.7.6 Monitoring and Enforcement by Labor Commissioner

Monitoring and enforcement of the prevailing wage laws and related requirements will be performed by the Labor Commissioner/ Department of Labor Standards Enforcement (DLSE). The Contractor and all subcontractors shall be required to furnish, at least "monthly" as defined by Labor Code section 1771.4(a)(3)(A)(i), certified payroll records directly to the Labor Commissioner in accordance with Labor Code section 1771.4. All payroll records shall be furnished in an electronic format and in the manner required by the Labor Commissioner. The Contractor and all subcontractors must sign up for, and utilize, the Labor Commissioner's electronic certified payroll records submission system. The District will have direct and immediate access to all CPRs for the Project that are submitted through the Labor Commissioner's system. The District can use this information for any appropriate purpose, including monitoring compliance, identifying suspected violations, and responding to Public Records Act requests.

The Labor Commissioner/ DLSE may conduct various compliance monitoring and enforcement activities including, but not limited to, confirming the accuracy of payroll records, conducting worker interviews, conducting audits, requiring submission of itemized statements prepared in accordance with Labor Code section 226, and conducting random in-person inspections of the Project site ("On-Site Visits"). On-Site Visits may include inspections of records, inspections of the Work site and observation of work activities, interviews of workers and others involved with the Project, and any other activities deemed necessary by the Labor Commissioner/DLSE to ensure compliance with prevailing wage requirements. The Labor Commissioner/DLSE shall have free access to any construction site or other place of labor and may obtain any information or statistics pertaining to the lawful duties of the Labor Commissioner/DLSE.

Any lawful activities conducted or any requests made by the Labor Commissioner/DLSE shall not be the basis for any delays, claims, costs, damages or liability of any kind against the District by the Contractor. Contractor and all subcontractors shall cooperate and comply with any lawful requests by

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the Labor Commissioner/ DLSE. The failure of the Labor Commissioner, DLSE, or any other entity related to the Department of Industrial Relations to comply with any requirement imposed by the California Code of Regulations, Title 8, Chapter 8 shall not of itself constitute a defense to the failure to pay prevailing wages or to comply with any other obligation imposed by Division 2, Part 7, Chapter 1 of the Labor Code.

Prior to commencing any Work on the Project, the Contractor shall post the required notice/poster required under the California Code of Regulations and Labor Code section 1771.4 in both English and Spanish at a conspicuous, weatherproof area at the Project site. The required notice/poster is available on the Labor Commissioner's website.

13.8 RECORDS OF WAGES PAID

13.8.1 Payroll Records

- a. Pursuant to §1776 of the Labor Code, the Contractor and each Subcontractor shall keep an accurate payroll record showing the name, address, social security number, work classification and straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker or other employee employed by him or her in connection with the Project.
- b. All payroll records, as specified in Labor Code §1776, of the Contractor and all Subcontractors shall be certified and furnished directly to the Labor Commissioner in accordance with Labor Code §1771.4(a)(3) once every thirty (30) days while Work is being performed on the Project and within thirty (30) days after the final day of Work performed on the Project (or more frequently if required by the District or the Labor Commissioner). The Contractor and all Subcontractors shall submit their own payroll records to the Labor Commissioner on the internet website of the Department of Industrial Relations and such payroll records shall be in an electronic format prescribed by the Labor Commissioner. Pursuant to Labor Code §1771.4(a)(3)(B), the Contractor and any Subcontractor who fails to furnish payroll records in accordance with Labor Code §1771.4(a)(3), relating to their own employees, shall be subject to a penalty by the Labor Commissioner. The amount of the penalty shall be One Hundred Dollars (\$100.00) for each calendar day in which such party is in violation of Labor Code §1771.4(a)(3), not to exceed a total penalty of Five Thousand Dollars (\$5,000.00) per project. Payroll records as specified in Labor Code §1776 shall also be certified and submitted to the District with each application for payment.

All payroll records shall be available for inspection at all reasonable hours at the principal office of the Contractor on the following basis:

1. A certified copy of an employee's payroll record shall be made available for inspection or furnished to the employee or his or her authorized representative on request.
2. A certified copy of all payroll records shall be made available for inspection or furnished upon request to a representative of District, the Division of Labor Standards Enforcement or the Division of Apprenticeship Standards of the Department of Industrial Relations.

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3. A certified copy of all payroll records shall be made available upon request by the public for inspection or for copies thereof. However, a request by the public shall be made through the District, the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement. If the requested payroll records have not been provided pursuant to Paragraph (2) above, the requesting party shall, prior to being provided the records, reimburse the costs, according to law for the preparation by the Contractor, Subcontractor(s), and the entity through which the request was made. The public shall not be given access to such records at the principal office of the Contractor.
- c. The certified payroll records shall be on forms provided by the Division of Labor Standards Enforcement or shall contain the same information as the forms provided by the Division of Labor Standards Enforcement.
- d. The Contractor or Subcontractor(s) shall file a certified copy of all payroll records with the entity that requested such records within 10 calendar days after receipt of a written request.
- e. Any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by the District, the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement shall be marked or obliterated to prevent disclosure of an individual's name, address and social security number. The name and address of the Contractor awarded the Contract or the Subcontractor(s) performing the Contract shall not be marked or obliterated. Any copy of records made available for inspection by, or furnished to, a joint labor-management committee established pursuant to the federal Labor Management Cooperation Act of 1978 (Section 175a of Title 29 of the United States Code) shall be marked or obliterated only to prevent disclosure of an individual's name and social security number. Notwithstanding any other provision of law, agencies that are included in the Joint Enforcement Strike Force on the Underground Economy established pursuant to Section 329 of the Unemployment Insurance Code and other law enforcement agencies investigating violations of law shall, upon request, be provided non-redacted copies of certified payroll records.
- f. The Contractor shall inform the District of the location of all payroll records, including the street address, city and county, and shall, within five working days, provide a notice of a change of location and address.
- g. The Contractor or Subcontractor(s) shall have 10 calendar days in which to comply subsequent to receipt of a written notice requesting payroll records. In the event that the Contractor or Subcontractor(s) fails to comply within the 10-day period, the Contractor or Subcontractor(s) shall, as a penalty to the District, forfeit One Hundred Dollars (\$100.00) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, these penalties shall be withheld from progress payments then due.

Responsibility for compliance with this Article shall rest upon the Contractor.

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13.8.2 Withholding of Contract Payments & Penalties

The District may withhold or delay contract payments to the Contractor and/or any Subcontractor if:

- a. The required prevailing rate of per diem wages determined by the Director of the Department of Industrial Relations is not paid to all workers employed on the Project; or
- b. The Contractor or Subcontractor(s) fail to submit all required certified payroll records to the Labor Commissioner in accordance with Labor Code §1771.4(a)(3); or
- c. The Contractor or Subcontractor(s) fail to submit all required certified payroll records with each application for payment, but not less than once per month; or
- d. The Contractor or Subcontractor(s) submit incomplete or inadequate payroll records; or
- e. The Contractor or Subcontractor(s) fail to comply with the Labor Code requirements concerning apprentices; or
- f. The Contractor or Subcontractor(s) fail to comply with any applicable state laws governing workers on public works projects.

13.9 APPRENTICES

13.9.1 Apprentice Wages and Definitions

All apprentices employed by the Contractor to perform services under the Contract shall be paid the standard wage paid to apprentices under the regulations of the craft or trade for which he or she is employed, and as determined by the Director of the Department of Industrial Relations, and shall be employed only at the craft or trade to which he or she is registered. Only apprentices, as defined in §3077 of the Labor Code, who are in training under apprenticeship standards that have been approved by the Chief of the Division of Apprenticeship Standards and who are parties to written apprenticeship agreements under Chapter 4 (commencing with §3070) of Division 3, are eligible to be employed under this Contract. The employment and training of each apprentice shall be in accordance with the apprenticeship standards and apprentice agreements under which he or she is training, or in accordance with the rules and regulations of the California Apprenticeship Council.

13.9.2 Employment of Apprentices

Contractor agrees to comply with the requirements of Labor Code §1777.5. The Contractor awarded the Project, or any Subcontractor under him or her, when performing any of the Work under the Contract or subcontract, employs workers in any apprenticeable craft or trade, the Contractor and Subcontractor shall employ apprentices in the ratio set forth in Labor Code §1777.5. The Contractor or any Subcontractor must apply to any apprenticeship program in the craft or trade that can provide apprentices to the Project site for a certificate approving the contractor or subcontractor under the apprenticeship standards for the employment and training of apprentices in the area or industry affected. However, the decision of the apprenticeship program to approve or deny a certificate shall be subject to review by the

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Administrator of Apprenticeship. The apprenticeship program or programs, upon approving the Contractor or Subcontractor, shall arrange for the dispatch of apprentices to the Contractor or Subcontractor upon the Contractor's or Subcontractor's request. "Apprenticeable craft or trade" as used in this Article means a craft or trade determined as an apprenticeable occupation in accordance with the rules and regulations prescribed by the California Apprenticeship Council. The ratio of work performed by apprentices to journeyman employed in a particular craft or trade on the Project shall be in accordance with Labor Code §1777.5.

13.9.3 Submission of Contract Information

Prior to commencing Work on the Project, the Contractor and Subcontractors shall submit contract award information to the applicable apprenticeship program(s) that can supply apprentices to the Project and make the request for the dispatch of apprentices in accordance with the Labor Code. The information submitted shall include an estimate of journeyman hours to be performed under the Contract, the number of apprentices proposed to be employed, and the approximate dates the apprentices would be employed. A copy of this information shall also be submitted to the District if requested. Within 60 days after concluding Work on the Project, the Contractor and Subcontractors shall submit to the District, if requested, and to the apprenticeship program a verified statement of the journeyman and apprentice hours performed on the Project.

13.9.4 Apprentice Fund

The Contractor or any Subcontractor under him or her, who, in performing any of the Work under the Contract, employs journeymen or apprentices in any apprenticeable craft or trade shall contribute to the California Apprenticeship Council the same amount that the Director determines is the prevailing amount of apprenticeship training contributions in the area of the Project. The Contractor and Subcontractors may take as a credit for payments to the California Apprenticeship Council any amounts paid by the Contractor or Subcontractor to an approved apprenticeship program that can supply apprentices to the Project. The Contractor and Subcontractors may add the amount of the contributions in computing his or her bid for the Contract.

13.9.5 Prime Contractor Compliance

The responsibility of compliance with Article 13 and §1777.5 of the Labor Code for all apprenticeable occupations is with the Prime Contractor. Any Contractor or Subcontractor that knowingly violates the provisions of this Article or Labor Code §1777.5 shall be subject to the penalties set forth in Labor Code §1777.7.

13.10 ASSIGNMENT OF ANTITRUST CLAIMS

13.10.1 Application

Pursuant to Government Code § 4551, in entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, the 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. § 15) or under the Cartwright Act (Chapter 2 [commencing with § 16700] of Part 2 of Division 7 of the Business and Professions Code), arising from the purchase of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders Retention Payment to the Contractor, without further acknowledgment by the parties. If the District receives, either through

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judgment or settlement, a monetary recovery for a cause of action assigned under Chapter 11 (commencing with § 4550) of Division 5 of Title 1 of the Government Code, the assignor shall be entitled to receive reimbursement for actual legal costs incurred and may, upon demand, recover from the District any portion of the recovery, including treble damages, attributable to overcharges that were paid by the assignor but were not paid by the District as part of the bid price, less the expenses incurred in obtaining that portion of the recovery.

13.10.2 Assignment of Claim

Upon demand in writing by the assignor, the District shall, within one (1) year from such demand, reassign the cause of action assigned pursuant to this Article if the assignor has been or may have been injured by the violation of law for which the cause of action arose and the District has not been injured thereby or the District declines to file a court action for the cause of action.

13.11 STATE AND DISTRICT CONDUCTED AUDITS

Pursuant to and in accordance with the provisions of Government Code § 10532, or any amendments thereto, all books, records, and files of the District, the Contractor, or any Subcontractor connected with the performance of this Contract involving the expenditure of state funds in excess of Ten Thousand Dollars (\$10,000.00), including, but not limited to, the administration thereof, shall be subject to the examination and audit of the Office of the Auditor General of the State of California for a period of five (5) years after Retention Payment is made or a Notice of Completion is Recorded, whichever occurs first. Contractor shall preserve and cause to be preserved such books, records, hard drives, electronic media, and files for the audit period.

Pursuant to the remedies under Public Contract Code section 9201 and Government Code section 930.2, Contractor, through execution of this Agreement, also agrees the District shall have the right to review and audit, upon reasonable notice, the books and records of the Contractor concerning any monies associated with the Project. The purpose of this “Audit” is to quickly and efficiently resolve Disputes or Claims based on the actual costs incurred and to reduce the uncertainty in resolving Disputes or Claims with limited information. The District shall perform any audits at its own cost and any such audit shall be performed by an independent auditor, having no direct or indirect relationship with the functions or activities being audited or with the business conducted by the Contractor or District. In the event the independent auditor determines that Change Orders, response to Request for Proposals, Disputes, Claims, or other requests for payment are in error, or have has any other concerns or questions, the Auditor shall report the results of the Audit findings to the District and provide a copy to the Contractor after giving the District Board the opportunity for at least 10 days review. If the Contractor disputes the findings of the independent auditor, such dispute shall be handled in the manner set forth under Article 4.6.2.

If Contractor having agreed to the terms of this Contract fails to produce books or records requested by Auditor, such failure to produce books or records that were required to be preserved for audit, it shall be presumed that the information contained in the withheld books or records were unfavorable to the Contractor and the Auditor shall note this refusal in the results of the Audit findings for further evaluation by the District and the District’s Board. The refusal to release records that are concerning monies associated with the Project may be used as a grounds to debar the Contractor under Article 15 for failure to preserve records under Article 13.11 and the failure to produce required audit records may also be used as a grounds for a negative finding against the Contractor depending on the significance of the records that are withheld by Contractor. Failure to produce job cost data tied to job cost categories and budgets shall be presumed an intentional failure to produce key audit records. Similarly, failure to produce Daily Reports

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(prepared at or near the time of the Work actually took place (See Article 3.16) shall be presumed an intentional failure to produce key audited records.

If Contractor is seeking costs for inefficiency, home office overhead, or unanticipated increased costs due to delays or acceleration, Contractor shall also produce copies of the original bid tabulation utilized in submitting Contractor's bid for the Project. This document shall be considered confidential and shall not be subject to disclosure through a Public Records Act and shall not be distributed to anyone other than the District and the District's counsel. This bid tabulation shall only be used in litigation, arbitration, evaluation of Claims or Disputes, Audit, and trial. If the records for the bid tabulation are kept on a computer, the Contractor shall also produce all metadata (in native format) that accompanies the bid tabulation for inspection to prove the authenticity of the underlying bid tabulation. Failure to produce the bid tabulation for review of inefficiency, home office overhead, or unanticipated increased costs due to delays or accelerations shall be considered material evidence that the bid tabulation was not favorable to the Contractor. This evidence shall be entered as a jury instruction for trial that the bid tabulation was not produced and the bid tabulation information was unfavorable to the Contractor. The evidence may also be used in debarment proceedings, and noted as an exception to an Audit findings.

Upon notification of Contractor concerning the results of the audit and a reasonable time has passed for Contractor to respond to the Audit findings and if either there is no Dispute of the Audit findings under Article 4.6 or if the result after utilizing the Disputes Clause confirms the Audit findings, the District may seek reimbursement for overstated Disputes, Claims, or Change Orders and may also undertake debarment proceedings under Article 15 of these General Conditions.

13.12 STORM WATER POLLUTION PREVENTION

13.12.1 Application

This Section addresses the preparation, implementation and monitoring of a Storm Water Pollution Prevention Plan (SWPPP) for the purpose of preventing the discharge of pollutants from the construction site. This includes the elimination of pollution discharges such as improper dumping, spills or leakage from storage tanks or transfer areas. The District will not issue a Notice to Proceed until Contractor has prepared by a qualified individual and obtained approval of the Permit Registration Documents ("PRDs") that include a Notice of Intent, Construction Risk Calculation, Site Map, SWPPP, Annual Fee and any additional required documents from all applicable Local Governing Agencies including the Regional Water Quality Control Board. The Contractor shall also secure a certification that the Project has met all of the conditions of the General Construction Activity Storm Water Permit (GCASP) and comply with all applicable local, state and federal regulations governing storm water pollution prevention.

13.12.2 References and Materials

- California Stormwater Quality Association New Development and Redevelopment Best Management Practice Handbook
- 2009 California Stormwater Quality Association Construction BMP Handbook .
- State Water Resources Control Board (2009). Order 2009-0009-DWQ, NPDES General Permit No. CAS000002: Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction and Land Disturbing Activities. Available on-line at:

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- http://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.shtml.- Use materials of a class, grade and type needed to meet the performance described in the BMP Handbook.

13.12.3 Preparation and Approval

The Contractor shall prepare by a qualified individual the PRDs that include a Notice of Intent, Construction Risk Calculation, Site Map, SWPPP, Annual Fee and any additional required documents. The Contractor's Qualified SWPPP Developer ("QSD") shall prepare the Storm Water Pollution Prevention Plan (SWPPP) as required to comply with storm water pollution regulations for project sites with storm water discharges associated with construction activity such as clearing or demolition, grading, excavation and other land disturbances. The SWPPP shall apply to all areas that are directly related to construction activity, including but not limited to staging areas, storage yards, material borrow areas, and access roads.

13.12.3.1 The Contractor shall prepare and submit to the Local Governing Agencies and the District the SWPPP for review and approval if the project sites, new or existing, with land disturbance of 1 or more acres (or less than 1 acres if part of a common plan of development); the construction activity that results in land surface disturbances of less than one acre is part of a larger common plan of development or sale of one or more acres of disturbed land surface; or the construction activity associated with Linear Underground/Overhead Projects ("LUPs") including, but not limited to, those activities necessary for the installation of underground and overhead linear facilities (e.g., conduits, substructures, pipelines, towers, poles, cables, wires, connectors, switching, regulating and transforming equipment and associated ancillary facilities) and include, but are not limited to, underground utility mark-out, potholing, concrete and asphalt cutting and removal, trenching, excavation, boring and drilling, access road and pole/tower pad and cable/wire pull station, substation construction, substructure installation, construction of tower footings and/or foundations, pole and tower installations, pipeline installations, welding, concrete and/or pavement repair or replacement, and stockpile/borrow locations.

13.12.3.2 The Contractor shall also pay annual renewal fee(s) until the contract is completed and make all such checks payable to the State Water Resources Control Board. The Notice of Intent must be submitted at least two weeks prior to the commencement of construction activities.

13.12.3.3 The Contractor shall prepare the SWPPP by following the format in Sections 2, 3, 4 and Appendices A through F of the California Stormwater BMP Handbook - Construction, January 2009 edition, published by the California Stormwater Quality Association. The publication is available from:

California Stormwater
Quality Association
P.O. Box 2105
Menlo Park, CA 94026-2105
Phone: (650) 366-1042
E-mail: info@casqa.org

or

<https://www.casqa.org/store/products/tabid/154/p-167-construction-handbookportal-initial-subscription.aspx>

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13.12.3.4 Where land disturbance is less than 1 acre, any BMPs indicated in the BMP Handbook needed to prevent or minimize storm water pollution shall be implemented at no extra cost to the District.

13.12.3.5 Within two weeks after Award of Contract by the District, the Contractor shall submit to the District's Civil Engineer one copy of the PRDs including the SWPPP for review. After the District's approval, the Contractor shall provide approved copies of the SWPPP as follows: one copy each to the Project Inspector, Construction Manager, Architect, Commissioned Architect and District's Civil Engineer.

13.12.4 Implementation

The Contractor shall implement the Storm Water Pollution Prevention Plan by doing the following:

- a. Obtain a Waste Discharger Identification (WDID) number from the SWRCB before beginning construction. This number will be issued once your PRDs are administratively accepted and fee is received.
- b. Keep the SWPPP, REAPs, monitoring data on the construction site.
- c. Employ a Qualified SWPPP Practitioner (QSP) to implement the SWPPP during construction and develop Rain Event Action Plans ("REAPs").
- d. Install, inspect, maintain and monitor BMPs required by the General Permit.
- e. Install perimeter controls prior to starting other construction work at the site.
- f. Contain on-site storm water at the jobsite. Do not drain on-site water directly into the storm drain.
- g. Implement the SWPPP.
- h. Provide SWPPP and BMP implementation training for those responsible for implementing the SWPPP.
- i. Designate trained personnel for the proper implementation of the SWPPP.
- j. Conduct monitoring, as required, and assess compliance with the Numeric Action Levels (NALs) or Numeric Effluent Limitations (NELs) appropriate to your project.
- k. Report monitoring data:
 1. Maintain a paper or electronic copy of all required records for three years from the date generated or date submitted, whichever is last. These records must be available at the construction site until construction is completed.

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2. Have a QSD revise the SWPPP as needed to reflect the phases of construction and to suit changing site conditions and instances when properly installed systems are ineffective.
 3. Assist the District with entering any necessary data or information into the Stormwater Multi-Application and Reporting System (“SMARTS”) system.
1. At the end of Construction Contract:
 1. Submit Notice of Termination (NOT) into the SMARTS when construction is complete and conditions of termination listed in the NOT have been satisfied. A copy of the NOT can be found at: http://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.shtml.
 2. Leave in place storm water pollution prevention controls needed for post-construction storm water management and remove those that are not needed as determined by the District. Thereafter, left-in-place controls will be maintained by the District.
 3. Provide Site Monitoring Reports, SWPPP revisions, Compliance Certifications and related documents to the District. Post-construction storm water operation and management plan as mentioned in the compliance certifications are considered to be in place at the end of the Construction Contract.

13.12.5 Monitoring

The Contractor shall conduct examination of storm water pollution prevention controls as required by the State Water Resources Control Board (2009). Order 2009-0009-DWQ, NPDES General Permit No. CAS000002: Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction and Land Disturbing Activities. This includes properly qualified personnel performing all required monitoring, testing, inspections and monitoring. The Contractor shall also conduct examination of storm water pollution prevention controls, as well as before and after each storm event in compliance with the State Water Resources Control Board Order No. 2009-0009-DWQ, National Pollutant Discharge Elimination System General Permit No. CAS000002, Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction and Land Disturbance Activities (General Permit) (SWRCB, 2009).and at least once each 24-hour period during extended storm events to identify BMP effectiveness and implement repairs or BMP changes as soon as feasible. All maintenance related to a storm event should be completed within 48 hours of the storm event. The Contactor shall also prepare and maintain, at the jobsite, a log of each inspection using Site Monitoring Report forms.

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13.12.6 Liabilities and Penalties

- a. Review of the SWPPP and inspection logs by the District shall not relieve the Contractor from liabilities arising from non-compliance with storm water pollution regulations.
- b. Payment of penalties for non-compliance by the Contractor shall be the sole responsibility of the Contractor and will not be reimbursed by the District.
- c. Compliance with the Clean Water Act pertaining to construction activity is the sole responsibility of the Contractor. For any fine(s) levied against the District due to non-compliance by the Contractor, the District will deduct from the final payment due the Contractor the total amount of the fine(s) levied on the District, plus legal and associated costs.
- d. The Contractor shall submit to the District a completed NOI for change of information (Construction Site Information and Material Handling/Management Practices).

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ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

14.1 TERMINATION BY THE CONTRACTOR FOR CAUSE

14.1.1 Grounds for Termination

The Contractor may terminate the Contract if the Work is stopped for a period of thirty (30) consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons performing portions of the Work for whom the Contractor is contractually responsible, for only the following reasons:

- a. Issuance of an order of a court or other public authority having jurisdiction; or
- b. An act of the United State or California government, such as a declaration of national emergency.

14.1.2 Notice of Termination

If one of the above reasons exists, the Contractor may, upon written notice of seven (7) additional days to the District, terminate the Contract and recover from the District payment for Work executed and for reasonable costs verified by the Architect with respect to materials, equipment, tools, construction equipment, and machinery, including reasonable overhead, profit, and damages.

14.2 TERMINATION BY THE DISTRICT FOR CAUSE

14.2.1 Grounds for Termination

The District may terminate the Contractor and/or this Contract for the following reasons:

- a. Persistently or repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- b. Persistently or repeatedly is absent, without excuse, from the job site;
- c. Fails to make payment to Subcontractors, suppliers, materialmen, etc.;
- d. Persistently disregards laws, ordinances, rules, regulations, or orders of a public authority having jurisdiction;
- e. Fails to provide a schedule or fails or refuses to update schedules required under the Contract;
- f. Falls behind on the Project and refuses or fails to undertake a Recovery Schedule;
- g. If the Contractor has been debarred from performing Work
- h. Becomes bankrupt or insolvent, including the filing of a general assignment for the benefit of creditors; or

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- i. Otherwise is in substantial breach of a provision of the Contract Documents.

14.2.2 Notification of Termination

When any of the above reasons exist, the District may, without prejudice to any other rights or remedies of the District and after giving the Contractor and the Contractor's Surety written notice of seven (7) days, terminate the Contractor and/or this Contract and may, subject to any prior rights of the Surety:

- a. Take possession of the Project and of all material, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- b. Accept assignment of Subcontracts. Contractor acknowledges and agrees that if the District (in its sole and absolute discretion) decides to takeover completion of the Project, the Contractor agrees to immediately assign all subcontracts to the District which the District has chosen to accept;
- c. Complete the Work by any reasonable method the District may deem expedient, including contracting with a replacement contractor or contractors; and,
- d. Agree to accept a takeover and completion arrangement with Surety that is acceptable to the District Board.

14.2.3 Takeover and Completion of Work after Termination for Cause

A Termination for Cause is an urgent matter which requires immediate remediation since Project Work is open and incomplete, the site is subject to vandalism and theft, the Project site is considered a public nuisance, and there is a possibility of injury and deterioration of the Project Work and materials. Thus, the District shall be entitled to enter a takeover contract to either remediate the unfinished condition or complete the Work for this Project.

14.2.4 Payments Withheld

If the District terminates the Contract for one of the reasons stated in Article 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is complete. All costs associated with the termination and completion of the Project shall be the responsibility of the Contractor and/or its Surety.

14.2.5 Payments upon Completion

If the unpaid balance of the Contract Sum exceeds costs of completing the Work, including compensation for professional services and expenses made necessary thereby, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor and its Surety shall pay the difference to the District. The amount to be paid to the Contractor, or District, as the case may be, shall be certified by the Architect upon application. This payment obligation shall survive completion of the Contract.

14.2.6 Conversion of Termination Upon Determination by Any Court or Other Tribunal

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In the event the Contract or Contractor's performance of the Contract is terminated under Article 14.2, and it is finally determined by an arbitrator, court, jury or other tribunal having jurisdiction, for any reason, that the Contractor was not in default under the provisions hereof, or that the District's exercise of its rights under Article 14.2 was defective, deficient, ineffective, invalid or improper for any reason, the termination shall be deemed a Termination for Convenience by the District and thereupon, the rights and obligations of the District and the Contractor shall be determined in accordance with Article 14.3.1 hereof.

14.3 TERMINATION OF CONTRACT BY DISTRICT (CONTRACTOR NOT AT FAULT)

14.3.1 Termination for Convenience

District may terminate the Contract upon fifteen (15) calendar days of written notice to the Contractor and use any reasonable method the District deems expedient to complete the Project, including contracting with replacement contractor or contractors, if it is found that reasons beyond the control of either the District or Contractor make it impossible or against the District's interest to complete the Project. In such a case, the Contractor shall have no Claims against the District except for: (1) the actual cost for approved labor, materials, and services performed in accordance with the Contract Documents which have not otherwise been previously paid for and which are supported and documented through timesheets, invoices, receipts, or otherwise; and (2) profit and overhead of ten percent (10%) of the approved costs in item (1); and (3) termination cost of five percent (5%) of the approved costs in item (1). Contractor acknowledges and agrees that if the District (in its sole and absolute discretion) decides to takeover completion of the Project, the Contractor agrees to immediately assign all subcontracts to the District which the District has chosen to accept.

14.3.2 Non-Appropriation of Funds/ Insufficient Funds

In the event that sufficient funds are not appropriated to complete the Project or the District determines that sufficient funds are not available to complete the Project, District may terminate or suspend the completion of the Project at any time by giving written notice to the Contractor. In the event that the District exercises this option, the District shall pay for any and all work and materials completed or delivered onto the site for which value is received, and the value of any and all work then in progress and orders actually placed which cannot be canceled up to the date of notice of termination. The value of work and materials not otherwise already paid for by the District up to the time of termination under this Paragraph shall include a factor of fifteen percent (15%) for the Contractor's overhead and profit and there shall be no other costs or expenses paid to Contractor. All work, materials and orders paid for pursuant to this provision shall become the property of the District. District may, without cause, order Contractor in writing to suspend, delay or interrupt the Project in whole or in part for such period of time as District may determine. Adjustment shall be made for increases in the cost of performance of the Agreement caused by suspense, delay or interruption.

14.4 REMEDIES OTHER THAN TERMINATION

If a default occurs, the District may, without prejudice to any other right or remedy, including, without limitation, its right to terminate the Contract pursuant to Article 14.2, do any of the following:

- a. Permit the Contractor to continue under this Contract, but make good such deficiencies or complete the Contract by whatever method the District may deem expedient, and the cost

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and expense thereof shall be deducted from the Contract Price or paid by the Contractor to the District on demand;

- b. If the workmanship performed by the Contractor is faulty or defective materials are provided, erected or installed, then the District may order the Contractor to remove the faulty workmanship or defective materials and to replace the same with work or materials that conform to the Contract Documents, in which event the Contractor, at its sole costs and expense, shall proceed in accordance with the District's order and complete the same within the time period given by the District in its notice to the Contractor; or
- c. Initiate procedures to declare the Contractor a non-responsible bidder for a period of two (2) to five (5) years thereafter.

All amounts expended by the District in connection with the exercise of its rights hereunder shall accrue interest from the date expended until paid to the District at the maximum legal rate. The District may retain or withhold any such amounts from the Contract Price. If the Contractor is ordered to replace any faulty workmanship or defective materials pursuant to Paragraph (b) above, the Contractor shall replace the same with new work or materials approved by the Architect and the District, and, at its own cost, shall repair or replace, in a manner and to the extent the Architect and the District shall direct, all Work or material that is damaged, injured or destroyed by the removal of said faulty workmanship or defective material, or by the replacement of the same with acceptable work or materials. In no event shall anything in this Article be deemed to constitute a waiver by the District of any other rights or remedies that it may have at law or in equity, it being acknowledged and agreed by the Contractor that the remedies set forth in this Article are in addition to, and not in lieu of, any other rights or remedies that the District may have at law or in equity.

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ARTICLE 15 DEBARMENT

15.1 DEBARMENT MEANS THERE HAS BEEN A FINDING THAT THE CONTRACTOR IS NOT RESPONSIBLE.

During the course of the Project, or if it is determined through Change Orders, Claims, or Audit that a Contractor is not responsible, the District may, in addition to other remedies provided in the Contract, debar the Contractor from bidding or proposing on, or being awarded, and/or performing work on District contracts for a specified period of time, which generally will not exceed five (5) years, but may exceed five (5) years or be permanent if the circumstances warrant such debarment. In addition to the debarment proceeding, a finding that a Contractor is to be debarred shall result in the termination of any or all existing Contracts the Contractor may have with the District.

15.2 BOARD FINDING

The District may debar a Contractor if the Board, or the Board's delegatee, in its discretion, finds the Contractor has done any of the following:

15.2.1 Intentionally or with reckless disregard, violated any term of the Contract with the District

15.2.2 Committed an acts or omission which reflects on the Contractor's quality, fitness or capacity to perform Work for the District;

15.2.3 Committed an act or offense which indicates a lack of business integrity or business honesty; or,

15.2.4 Made or submitted a false claim against the District or any other public entity.

15.3 HEARING AND PRESENTATION OF EVIDENCE

If there is evidence that the Contractor may be subject to debarment, the District shall notify the Contractor in writing of the evidence which is the basis for the proposed debarment and shall advise the Contractor of the scheduled date for a debarment hearing before the District Board or its delegated designee.

The District Board, or designee, shall conduct a hearing where evidence on the proposed debarment is presented. The Contractor or the Contractor's representative shall be given an opportunity to submit evidence at the hearing. The Contractor shall be provided an adequate amount of time to prepare and object to evidence presented. A tentative proposed decision shall be issued as a tentative decision and the District shall be entitled to modify, deny or adopt the proposed decision. The proposed decision shall contain a recommendation regarding whether the Contractor should be debarred, and, if so, the appropriate length of time of the debarment. The Contractor and the District shall be provided an opportunity to object to the tentative proposed decision for a period of 15 days. If additional evidence is presented, the District shall evaluate this evidence and either issue an amended ruling, issue the same ruling, or call a further hearing.

If a Contractor has been debarred for a period of longer than five (5) years, that Contractor may after the debarment has been in effect for at least five (5) years, submit a written request for review of the debarment determination to reduce the period of debarment or terminate the debarment. The District may,

GENERAL CONDITIONS

in its discretion, reduce the period of debarment or terminate the debarment if it finds that the Contractor has adequately demonstrated one or more of the following: (1) elimination of the grounds for which the debarment was imposed; (2) a bona fide change in ownership or management; (3) material evidence discovered after debarment was imposed; or (4) any other reason that is in the best interests of the District.

The District will consider a request for review of a debarment determination only where: (1) the Contractor has been debarred for a period longer than five (5) years; (2) the debarment has been in effect for at least five (5) years; and (3) the request is in writing, states one or more of the grounds for reduction of the debarment period or termination of the debarment, and includes supporting documentation. Upon receiving an appropriate request, the District will provide notice of the hearing on the request. At the hearing, the District shall review evidence on the proposed reduction of debarment period. This hearing shall be conducted and the request for review decided by the District pursuant to the same procedures as for a debarment hearing.

The District's proposed decision shall contain a recommendation on the request to reduce the period of debarment or terminate the debarment.

The terms shall also apply to Subcontractors of Contractor.

[End of General Condition Articles]

EXHIBIT A

OWNER CONTROLLED INSURANCE PROGRAM (OCIP)

1.1 INTRODUCTION

The District, hereinafter referenced as “District” or “Owner”, has elected, at its sole discretion, to implement an Owner Controlled Insurance Program (“OCIP”) under the Statewide Educational Wrap Up Program (“SEWUP”). The SEWUP Joint Powers Authority (“JPA”) will be providing the OCIP on behalf of the Owner. All terms and conditions of the SEWUP Contractual Provisions will apply during the term of the contract.

The SEWUP JPA will provide Workers’ Compensation, Employer’s Liability, General & Excess Liability, and Contractor’s Pollution Liability for all Enrolled Contractors (and their Enrolled Subcontractors of every tier) and other designated parties for work performed at the Project Site (hereinafter called “Project”) as well as builder’s risk insurance. The Owner agrees to pay all premiums associated with the OCIP, unless otherwise stated in this section and in other contract documents. The OCIP coverages will be primary to other valid and collectable insurance for the owner and enrolled parties in the program.

Insurance coverage provided under the OCIP is limited in scope and specific to work performed after the inception date of enrollment into the OCIP. Labor and ongoing operations related to offsite locations are not covered by the OCIP. In addition to any insurance provided by the Owner, all Contractors/Subcontractors will be responsible for providing certain insurance as specified in section 1.7. The Owner recommends that Contractors discuss the OCIP with their insurance agents, brokers or consultants to ensure that other proper coverages are maintained, prior to contract acceptance.

Keenan & Associates, hereinafter called “Program Administrator”, shall administer the OCIP on behalf of the SEWUP JPA. At all times, all Contractors/Subcontractors shall: (a) cooperate with Owner, Program Administrator, and all OCIP insurers, as applicable, and their respective consultants, agents and representatives, in its or their administration of the OCIP and all other terms and conditions described herein, and (b) comply with the terms, conditions, warranties, and subjectivities of the insurance policies provided pursuant to the OCIP, including, without limitation, any and all directives and requirements of Owner’s and the OCIP insurers’ respective consultants, agents and representatives, including, without limitation, any directive or requirement relating to loss control, and quality control, and the closure to Owner’s satisfaction of open items on any and all quality control checklists and inventories.

A. Participation in the OCIP

Participation in the OCIP is mandatory but not automatic. Each Eligible Contractor/Subcontractor must follow the guidelines, as specified in section 1.5.

Definitions:

Enrollment: An Eligible Contractor/Subcontractor is considered Enrolled once required documents are received, reviewed, and processed by the OCIP Program Administrator to the insurer. (See Sections 1.7 and 1.8)

Contractor: Includes all vendors, suppliers, businesses, persons, or entities and entities which the Owner has engaged directly by contract to perform services relating to the Project.

Subcontractor: Includes, but is not limited to, all businesses, vendors, suppliers, and other persons or entities that have been engaged by a Contractor to perform or assist with the performance of services relating to the Project, including all sub-tier contractors.

Eligible: Includes all Contractors/Subcontractors providing direct labor on the Project, and excludes Ineligible Contractors, as defined below. Temporary labor services and leasing companies are to be treated as Eligible Contractors.

Ineligible: It is not the intent to insure certain entities and scopes of work, including, but not necessarily limited to the following: consultants; suppliers; abatement and/or removal of hazardous materials; vendors; off-site fabricators; materials dealers; surveyors; guard services; non-construction janitorial services; and truckers, including trucking to the Project where delivery is the only scope of work performed; and contractors performing landscape maintenance (though landscape work itself is covered). Ineligible parties are required to ensure that any eligible subcontractors who provide on-site labor comply with the OCIP Enrollment. Program Administrator reserves the right to reconsider an ineligible entity's participation in the OCIP should its scope of work or contract change at any time. **Any questions regarding a contractor's status as "Eligible" or "Ineligible" should be referred by written request to Owner and approved by the Program Administrator.**

EACH CONTRACTOR/SUBCONTRACTOR MUST INCLUDE THIS DOCUMENT WITH THEIR BID SPECIFICATIONS TO ANY AND ALL SUBCONTRACTORS, INCLUDING ALL SUB-TIER SUBCONTRACTORS. Any contractor/subcontractor's failure to comply with the OCIP Administrator and all OCIP requirements shall be considered non-compliant under the contract.

Enrollment of each Contractor's eligible Subcontractors is mandatory. Contractor shall notify Owner and the Program Administrator in writing of the identity of each Subcontractor regardless of enrollment eligibility and shall cause each Subcontractor to notify the Program Administrator in writing of the identity of each of its Sub-subcontractors, prior to such party's commencement of their work and entry onto the Project. Contractors and Subcontractors of all tiers shall not be deemed enrolled until the Program Administrator and OCIP insurers receive and approve a completed Contract Enrollment Form for each awarded contract. Enrollment is required prior to commencement of on-site activities but no contractor shall be enrolled sooner than 30 days prior to their start date. Each Contractor/Subcontractor shall be solely responsible for any and all losses, damages, claims, liabilities, and suits arising out of such Subcontractor's failure to enroll, or delay in enrolling, any of its Subcontractors.

Unless otherwise directed by the Owner, Ineligible Contractors and Subcontractors will be required to maintain their own insurance for both on-site and off-site activities and will be required to participate in the Project Safety Program (See Section 1.16). Minimum Insurance and endorsement requirements are located in Section 1.7 & 1.8. Each ineligible contractor must register with the OCIP's online portal ("WrapPortal"). All required certificates and endorsements must be supplied via WrapPortal.

B. Project Site and Offsite Premises

Coverages provided by the OCIP are **Project Site** specific. The Project Site shall be designated by the Owner. The Project Site consists of any and all projects that are endorsed to this policy, which includes the following:

1. Ways and means adjoining the endorsed project site.
2. Adjacent locations to the endorsed project sites where incidental operations are being performed, excluding permanent locations.

With the exception of 1 and 2 mentioned above, off-site locations, labor and ongoing operations are not covered by the OCIP. It will be the responsibility of each Contractor/Subcontractor to maintain off-site insurance, as identified in Section 1.7, which specifies coverage types and minimum limits. Contractor/Subcontractor will promptly furnish to the Owner, or its designated representative, Certificates of Insurance evidencing that all required insurance is in force.

1.2 PREQUALIFICATION & COST IDENTIFICATION

A. Contractor Pre-Qualification

Pursuant to Government Code Section 4420.5, Bidders must meet certain minimum standards to bid on the Owners' Project. The following qualification standards apply to ALL Bidding Contractors at time of bid opening:

- 1. Average Workers' Compensation Experience Modification Rate (EMR) of 1.25 or less over the last five (5) years OR the current published year.**
 - a. We encourage the bidder to choose subcontractors who meet these requirements however this will not exclude eligible subcontractors from enrolling in the OCIP.*
- 2. Zero (0) Serious and Willful violations (Labor Code Section 6300) against them in the past five (5) years**
- 3. Evidence of an Injury and Illness Prevention Program (IIPP). Evidence is required to be submitted post bid opening and prior to bid award.**

FAILURE TO MEET THESE MINIMUM STANDARDS SHALL DISQUALIFY THE BIDDER.

B. Contractor Insurance Cost Identification

Contractor's base bid shall exclude all costs for insurance coverages provided under the OCIP. If insurance cost is not removed, the bidder may not qualify as the lowest responsive bidder. The Bidder declares under penalty of perjury under California law, that the base bid excludes any costs relating to any insurance coverages afforded under the OCIP and that each subcontractor to the Bidder has similarly excluded costs for any insurance coverage afforded under the OCIP.

C. Change Order Pricing

All Contractors/Subcontractors declare, under penalty of perjury under California law, that any change order issued to the contract is priced to exclude any costs relating to any insurance coverage afforded under the OCIP.

1.3 OWNER-PROVIDED INSURANCE COVERAGES

CONTRACTOR/SUBCONTRACTOR SHOULD REFER TO THE ACTUAL POLICIES FOR DETAILS CONCERNING COVERAGE, EXCLUSIONS, AND LIMITATIONS. THE ORIGINAL POLICIES WILL PREVAIL AS THE SOLE BINDING AGREEMENT IN CONNECTION WITH ANY CLAIM OR QUESTION REGARDING COVERAGE PROVIDED BY THE OCIP. OCIP POLICIES AND PROJECT INSURANCE MANUAL ARE AVAILABLE UPON WRITTEN REQUEST TO THE PROGRAM ADMINISTRATOR.

THE OCIP IS INTENDED TO PROVIDE BROAD COVERAGES AND HIGH LIMITS TO ALL ENROLLED CONTRACTORS/SUBCONTRACTORS. THE OWNER DOES NOT WARRANT OR REPRESENT THAT THE OCIP COVERAGES CONSTITUTE AN INSURANCE PROGRAM THAT COMPLETELY ADDRESSES THE RISKS OF THE CONTRACTORS/SUBCONTRACTORS. PRIOR TO CONTRACT AWARD, IT IS THE RESPONSIBILITY OF ALL CONTRACTORS/SUBCONTRACTORS TO ENSURE THAT THE OCIP COVERAGES PROVIDED SUFFICIENTLY ADDRESS THEIR INSURANCE NEEDS. UPON REQUEST, OCIP POLICIES ARE AVAILABLE FOR REVIEW.

OCIP coverage applies only to Work performed under the contract at the Project (see Section 1.1, B for definition). All Contractors must provide their own insurance for Automobile Liability and off-site locations, labor, and operations.

Such policies or programs may be amended from time to time, and the terms of such policies or programs, as amended, are incorporated herein by reference.

The Contractors/Subcontractors enrolled in the OCIP agree that the OCIP policies' limits of liability, coverage terms and conditions shall determine the scope of coverage provided by the OCIP. As of October 1, 2023, 100% of the limits are available with a minimum of \$800 Million in construction values to be insured.

A. Workers' Compensation and Employer's Liability Insurance will be provided in accordance with applicable state laws to all Enrolled Contractors/Subcontractors (each as a named insured, and issued an individual policy) reflecting the following Limits of Liability:

Workers' Compensation: California Statutory Benefits

Employer's Liability:

- \$1,000,000 Bodily Injury each Accident
- \$1,000,000 Bodily Injury by Disease – Policy Limit
- \$1,000,000 Bodily Injury by Disease – Each Employee

1. Deductible: None

2. Exclusions: The known exclusions for this coverage are set forth below:

| | |
|--|---|
| Bodily Injury Outside US or Canada | Intentional or Aggravated Bodily Injury |
| Bodily Injury To Any Member of Flying Crew | Obligations Imposed By Disability Benefits or Any Similar Law |
| Bodily Injury To Person Subject To Federal Workers' Compensation | Obligations Imposed By Occupational Disease Laws |
| Bodily Injury To Person Subject To Occupational Disease Laws | Obligations Imposed By Unemployment Compensation Laws |
| Contractual Liability | Obligations Imposed By Workers' Compensation Laws |
| Employees Knowingly Employed Illegally | State or Federal Law Violation Fines, Penalties |
| Employment Related Practices | |

This is a summary and may not be exhaustive. The policy language may contain additional exclusionary language, limitations or carve-backs that are not identified on the table. It is the responsibility of the Contractor/Subcontractor to review the policy for the complete details of all exclusions.

3. **Policy Term:** The master policy effective date is October 1, 2023. The policy term is three years, with one automatic two-year renewal. The policy is intended to remain in effect for duration of the contractor's contracted work. Warranty work and post contract repair work is excluded. Each Contractor/Subcontractor is insured under the policy for the length of its work at the Project.

B. General and Excess Liability Insurance is written on an "Occurrence" form under master liability policies. Certificates of Insurance will be provided to all enrolled Contractors/Subcontractors as named insureds, with the total limits of liability reflecting the following:

- \$125,000,000 Bodily Injury and Property Damage Liability
- \$195,000,000 General Aggregate
- \$125,000,000 Products and Completed Operations
- 10 Years Completed Operations

1. Deductible: None

2. Conditional Warranties*:

- a. **Subsidence:** It is expressly warranted that the Named Insured and all Contractors and Sub-Contractors comply with all recommendations contained in the geotechnical/environmental reports. Failure to comply will result in subsidence coverage being null and void and a full subsidence exclusion would be re-instated.

b. **EIFS Installation Agreement:** The following terms and conditions shall be satisfied in connection with all EIFS work on any Project:

- ii. EIFS work is to be specifically identified and its value declared.
- iii. All EIFS work will be monitored by an independent EIFS inspection company to document compliance with manufacturers' handling and installation instructions.
- iv. EIFS product manufacturers and warranty providers will be identified and provided to the Owner.

3. **Exclusions:** The known exclusions for this coverage are set forth below:

| | |
|--|--|
| Aircraft, Auto or Watercraft | Nuclear |
| Asbestos | Personal and Advertising Bodily Injury |
| Medical Payments Coverage | Pollution and Hazardous Materials |
| Certain Exclusions to Personal and Advertising Injury Liability | Prior Continuous, or Progressively Deteriorating Injury or Damage |
| Certified Acts of Terrorism | Professional Liability |
| Communicable Disease | Property Damage to the Project During the Course of Construction |
| Contractual Liability (Limited Coverage Provided) | Punitive Damages |
| Cross Suits – Limited | Residential and Condominium Conversion |
| Cyber and Data | Recall of Products, Work Or Impaired Property |
| Employers Liability | Silica or Silica Mixed Dust |
| | Subsidence - Conditional Warranty – So long as Contractor/Subcontractors follows specifications of geotechnical/environmental reports then the exclusion will be waived; if not, exclusion will be fully implemented |
| Employment Related Practices | Violation of Statutes Governing Collecting, Transmitting Information |
| Expected or Intended Injury | Violation of Statutes Governing Email, Fax, Phone Calls |
| | War |
| Fungi Or Bacteria | Workers Compensation and Similar Laws |
| Lead | |
| Certain exclusions for transportation or use of Mobile Equipment | |

This is a summary and may not be exhaustive. The policy language may contain additional exclusionary language, limitations or carve-backs that are not identified on the table. It is the responsibility of the Contractor/Subcontractor to review the policy for the complete details of all exclusions and policy terms.

4. **Policy Term:**

- a. The master policy effective date is October 1, 2023. The policy is intended to remain in effect for the length of the construction of the Project or through October 1, 2028 at 12:01am, whichever comes first.
- b. Ten years Products and Completed Operations coverage

C. Contractor's Pollution Liability is written on an "Occurrence" form under a master liability policy. Certificates of Insurance will be provided to all enrolled Contractors/Subcontractors, as named insured, reflecting the following Limits of Liability:

- \$15,000,000 Per Occurrence / \$25,000,000 Policy Aggregate
- Defense costs are outside of limits up to \$1,000,000.

1. \$10,000 Deductible per Occurrence

2. Contractor/Subcontractor shall be liable for payment of the deductible, at its expense; to the extent claims payable are attributable to their acts or omissions and/or the acts or omissions of its Subcontractors of any tier or any other entity or person for whom it may be responsible. The

deductible will apply to each occurrence and must be satisfied prior to payment of the loss. The deductible amount shall not be reimbursed by the OCIP Insurance Program or the District.

3. Exclusions: The known exclusions for this coverage are set forth below:

| | |
|---|---------------------------------------|
| Auto, Aircraft, Vessel Or Rolling Stock | Nuclear |
| Claims Between Certain Insureds | Other Entities |
| Contractual Liability | Pre-Existing Conditions |
| Damage To Property | Products |
| Fines, Penalties, and Treble Damages | Terrorism |
| Employment Related Practices | War |
| Owned Hazardous Materials Facility | Workers Compensation and Similar Laws |

This is a summary and may not be exhaustive. The policy language may contain additional exclusionary language, limitations or carve-backs that are not identified on the table. It is the responsibility of the Contractor/Subcontractor to review the policy for the complete details of all exclusions.

4. Policy Term:

- a. The master policy effective date is October 1, 2023. The policy is intended to remain in effect for the length of the Project or through October 1, 2028 at 12:01am, whichever comes first.

D. Builder's Risk coverage will be in place during the course of construction at the Project. Such insurance shall be written on a repair or replacement cost basis, subject to exclusions, sub limits, property limitations and conditions. Such insurance shall include the interests of the Owner as named insured and enrolled Contractors/Subcontractors as additional insureds. The deductible schedule is as follows:

Deductibles

- \$5,000 - \$50,000 deductible (depending on type of structure) for Wood Frame, Modular, Tilt-Up Construction, Joisted Masonry, and Fire Resistive / Non-Combustible / Masonry Non-Combustible.
 - Up to \$100,000 deductible for Water Damage to All Construction Types
 - Deductibles are subject to increase if a Project's Builder's Risk term is extended 60 days or more.
1. Contractor/Subcontractors shall be responsible for the applicable deductible. The deductible shall apply to each occurrence and must be satisfied prior to payment of the loss. The deductible shall not be reimbursed by the OCIP Insurance Program or the District.
 2. Exclusions: The known exclusions for this coverage are set forth below:

| | |
|--|--|
| Asbestos | Foreign Terrorism |
| Certain Offsite Property | Infidelity, Dishonesty, Fraudulent Activity of Insured |
| Certain Release, Discharge, Escape, or Dispersal of Contaminants or Pollutants | Land, Values of Land, Cut, & Fill etc. Prior to Project Commencement |
| Certified Acts of Terrorism (Optional Coverage) | Loss Under Any Manufacturer or Supplier Guarantee/Warranty |
| Cessation of Work | Normal Subsidence |
| Consequential Loss (except as provided in Delay in Opening Coverage) | Nuclear |
| Communicable Disease | Offshore or Barrier Island Property |
| Contractor's Tools, Machinery, Plans, Equipment | Property That Stores, Processes, or Handles Radioactive Materials |
| Cost of Making Good (Optional Coverage) | |

| | |
|---|--|
| Damage to Existing Property (Optional Coverage) | Rolling Stock, Aircraft, Watercraft |
| Damage While Testing Prototype or Used Machinery/Equipment | Software Loss, unless results from an Open Peril |
| Damages, Fines, Penalties at Government Agency or Court Order | Standing Timber, Growing Crops, Animals |
| Disappearance or When Revealed by Inventory Shortage Alone | Vehicles or Equipment Licensed For Highway Use |
| Earth Movement (Optional Coverage) | War and Military Action |
| Electrical, Magnetic, or Errors Related to Electronic Records | |
| Financial Accounts, Instruments, Stamps, Deeds, Precious Material | |
| Flood (Optional Coverage) (rain and the accumulation of rainwater included in Flood definition) | |

This builder's risk coverage and exclusion summary may not be all inclusive. The policy language may contain additional exclusionary language, limitations or carve-backs that are not identified on the table. It is the responsibility of the Contractor/Subcontractor to review the policy for the complete details of all exclusions, sublimit and deductibles.

Special Conditions: All Wood Frame and Modular projects are subject to Protective Safeguards as shown in A

3. [EXHIBIT A](#).
4. **Policy Term:** The policy term is the term of the project.
5. *All Contractors'/Subcontractors' shall be responsible for any loss or damage to their personal property. This would include, but is not limited to, tools, equipment, mobile construction equipment, or materials NOT intended to be a permanent part of the building, whether owned, borrowed, used, leased, or rented by any Contractor/Subcontractor. Any insurance purchased by the Contractors/Subcontractors, or self-insurance, shall be the Contractors'/Subcontractors' sole source of recovery in the event of a loss.*

E. OCIP Policies Establish OCIP Coverage. The insurance coverages, limits of liability, definitions, terms, conditions, exclusions and limitations referenced in these contractual provisions and the other contract documents are set forth in full in the OCIP insurance policies. The summary descriptions of such policies in these contractual provisions, in the Project Insurance Manual, or in any other contract document or elsewhere are not intended to be complete or to alter or amend any provisions of the actual OCIP policies. To the extent, if any, such descriptions herein or therein conflict with any such insurance policies, the provisions of the actual insurance policies shall govern. To the extent there are any other conflicts between or among the provisions of such insurance policies, these contractual provisions, the contract documents, or the Project Insurance Manual, then in descending order, the insurance policies shall govern, followed by these contractual provisions, the contract, the other contract documents, then the Project Insurance Manual. Contractor/Subcontractor acknowledges that it has had the opportunity to review the insurance policies as provided in Section 1.3, and that it is relying solely on the provisions set forth in the insurance policies, and not upon any oral or written statement or reference in these contractual provisions, any other contract document, the Project Insurance Manual, or otherwise.

1.4 OCIP CERTIFICATES AND POLICIES

All Enrolled Contractors/Subcontractors will receive Certificates of Insurance for Workers' Compensation, General Liability, Excess Liability and Contractor's Pollution Liability coverages. Each enrolled Contractor/Subcontractor will receive their own Workers' Compensation policy. Program Administrator will provide a copy of the OCIP policies upon written request. Such policies or programs may be amended from time to time and the terms of such policies or programs, as they may be amended, are incorporated herein by reference. Contractors/Subcontractors hereby agree to be bound by the terms of coverage, as contained in such insurance policies and/or self-insurance programs.

1.5 **CONTRACTOR/SUBCONTRACTOR RESPONSIBILITIES**

Participation in the OCIP is mandatory but not automatic. Contractor /Subcontractor must comply with the following:

A. Contractor Eligibility, see Section 1.1, **A** for definition.

B. Contractor Registration & Enrollment

The Program Administrator will provide online registration via WrapPortal (see Section 1.1 A); a User Name, Password and URL for website enrollment will be provided to each Subcontractor upon entry of Subcontractor identifying information into WrapPortal by Contractor or Parent Subcontractor regardless of enrollment eligibility.

An Eligible Contractor/subcontractor is not enrolled until the Program Administrator and OCIP insurers receive and approve a completed OCIP Enrollment via WrapPortal for each awarded contract. Subcontractor shall also upload declarations pages, including proof of rates from Subcontractor's current policies. Enrollment is required prior to commencement of on-site activities but no Subcontractor shall be enrolled sooner than 30 days prior to their start date. Subcontractors must provide the Required Insurance Coverages (see Sections 1.7 and 1.8) via WrapPortal.

Any Subcontractor who enrolls in the OCIP after their start date must provide a No-Known-Loss Letter to the Program Administrator, along with the enrollment documentation. Late Enrollment is not guaranteed and must be approved and accepted by the insurance carrier. Upon approval, the Program Administrator will provide evidence of OCIP coverage to the Subcontractor, as noted in Section 1.4

All Contractors/Subcontractors of all tiers shall cooperate with and require their Subcontractors to cooperate with the Owner and the Program Administrator regarding the administration and operation of the OCIP.

C. Contractor/Subcontractor Compliance with Other Forms and Procedures

All Enrolled Contractors/Subcontractors are required to complete and submit the following forms:

1. Project Site Monthly Payroll Report

Project Site Monthly Payroll must be submitted to the Program Administrator by the 10th of each month via WrapPortal until the completion of the contract and in no event shall be later than the 15th of each month. This report must summarize the unburdened payroll by Workers' Compensation Class Code. Certified payroll is not a requirement of the OCIP and cannot be accepted. **If the Project Site Monthly Payroll Report is not submitted to the Program Administrator, the Contractor, Construction Manager and/or Owner may withhold payment from the prime or parent contractor until the report is received.** Subcontractor agrees to keep and maintain accurate and classified records of their payroll for operations at the Project Site. This payroll information is submitted to the OCIP insurer. At the end of each contract, a carrier audit may be performed using the reported payroll and other supporting documents, as required by the California Workers Compensation Insurance Rating Bureau (WCIRB).

Workers' Compensation Insurance Rating Bureau Requirements

Once an Eligible Contractor/Subcontractor is enrolled into the OCIP, a separate Workers' Compensation Policy will be issued to them. All Enrolled Contractors/Subcontractors shall comply with the rules and regulations of the California Workers Compensation Insurance Rating Bureau (WCIRB).

2. Contractor's Completion Notice

Contractor's Completion Notice must be submitted to the Program Administrator via WrapPortal upon completion of work at the Project, which includes punch list items, but not warranty work. Contractor/Subcontractor shall cooperate with Contractor in completing the *Contractor's Completion Notice*. The Contractor's Completion Notice shall evidence all enrolled Contractors/Subcontractors' **final contract value, actual start and completion dates**, per contract. This information is used to confirm that each Workers' Compensation Policy was issued with correct policy term dates, covering the Contractors/Subcontractors for the duration of their work at the Project. This information is subsequently submitted to the Workers' Compensation Insurance Rating Bureau (WCIRB).

3. Project Insurance Manual

A Project Insurance Manual will be provided to all awarded Contractors/Subcontractors, which includes a Program Summary, Claims Reporting Instructions, Project Safety Guidelines, necessary forms, and contact information. Copies can be requested from the Program Administrator.

Contractor/Subcontractor Compliance with all aspects of the OCIP

All Contractors/Subcontractors further acknowledge and agree to comply fully and promptly with such safety, loss control, and quality control rules, requirements, and directives as may from time to time be promulgated by Owner, the Program Administrator and/or the OCIP insurers or any of its or their respective consultants, agents, or representatives. Neither the Contractor or Subcontractor of any tier shall impede or otherwise prevent Owner, their representatives or the Program Administrator or their respective consultants from entering or otherwise accessing the project or its related off-site locations. Nothing in this document, or any other contract document or in the Project Insurance Manual, shall be deemed to render Owner or any of its affiliates of any tier an employer of Contractor/Subcontractor or any of its Subcontractors or any of its or their personnel or employees.

Failure to comply will be considered non-performance under the contract.

It is the obligation of each Eligible Contractor/Subcontractor to enroll in the OCIP and to comply with all OCIP requirements set forth in these contractual provisions, in the OCIP insurance policies, in the Project Insurance Manual, and elsewhere in the contract documents. Contractor/Subcontractor shall provide each of its Subcontractors, among other things, with a copy of the Project Insurance Manual and a copy of these contractual provisions. Contractor/Subcontractor shall require in writing that each enrolling Subcontractor comply with, among other things, the provisions of the OCIP insurance policies, the Project Insurance Manual, and the contract documents. All such requirements shall be included in all subcontracts and sub-subcontracts with eligible parties. The failure of Contractor/Subcontractor or any other party to provide eligible Subcontractors with a copy of this document, the Project Insurance Manual, and/or all other applicable requirements shall not relieve any such Subcontractor of any of the obligations contained therein.

Contractor/Subcontractor shall keep and maintain accurate records and information in accordance with the requirements of the OCIP Insurer(s), the Project Administrator, the Project Insurance Manual, and the contract documents, and shall provide such records and information to Owner, the Program Administrator, and/or the OCIP insurers upon request.

1.6 **OCIP DISCLAIMER**

The Owner does not warrant or represent that the OCIP coverages constitute an insurance program that completely addresses all the risks of the Contractors/Subcontractors. Prior to the commencement of work under the contract, it is the responsibility of all Contractors/Subcontractors to ensure that the OCIP coverages provided sufficiently address their insurance needs. Any additional insurance coverage purchased will be at Contractor's/Subcontractor's option and sole expense.

1.7 REQUIRED CONTRACTOR/SUBCONTRACTOR PROVIDED INSURANCE COVERAGES

For any work under this contract, and until completion and final acceptance of the work by the Owner, the Contractors/Subcontractors shall, at their own expense, promptly furnish Certificates of Insurance evidencing that coverage is in force and any required Additional Insured Endorsements to the Owner, with a copy to the Program Administrator for the following coverages, before commencing work on the Project.

- A. Automobile Liability Insurance Requirements and Limits:** See Section 1.8 for Certificate Holder and Additional Insured Endorsement specifications. Automobile Liability Insurance must cover all vehicles owned by, hired by, or used on behalf of the Contractors/Subcontractors for both Project Site and off-site operations with the following minimum limits of liability:

Auto Liability Insurance Limits required:

All Contractors/Subcontractors*

| <u>General/Prime Contractor</u> | <u>Subcontractor</u> | |
|---------------------------------|----------------------|---|
| \$2,000,000 | \$1,000,000 | Bodily Injury and Property Damage Liability |

***See Section 1.8 for additional insured language**

- B. Workers' Compensation and Employer's Liability Insurance Limits:**

Workers' Compensation –Statutory Benefits - All States

Employer's Liability:

\$1,000,000 Bodily Injury each Accident
\$1,000,000 Bodily Injury by Disease – Policy Limit
\$1,000,000 Bodily Injury by Disease – Each Employee

- C. General Liability Insurance, minimum limits of liability are as follows:**

Eligible Contractors/Subcontractors

| <u>General/Prime Contractor</u> | <u>Subcontractor</u> | |
|---------------------------------|----------------------|--|
| \$2,000,000 | \$1,000,000 | Bodily Injury and Property Damage Liability Per Occurrence |
| \$2,000,000 | \$1,000,000 | General Aggregate |
| \$2,000,000 | \$1,000,000 | Products/Completed Operations Aggregate |
| \$2,000,000 | \$1,000,000 | Personal/Advertising Injury Liability Per Person or Organization |

Ineligible Contractors / Subcontractors (Excluded)

| <u>General/Prime Contractor</u> | <u>Subcontractor</u> | |
|---------------------------------|----------------------|--|
| \$2,000,000 | \$1,000,000 | Bodily Injury and Property Damage Liability Per Occurrence |
| \$2,000,000 | \$1,000,000 | General Aggregate |
| \$2,000,000 | \$1,000,000 | Products/Completed Operations Aggregate |
| \$2,000,000 | \$1,000,000 | Personal/Advertising Injury Liability Per Person or Organization |

- D. Professional Liability Insurance:** If Contractor's/Subcontractor's work requires design and/or design-assist services, or Contractor/Subcontractor performs professional services of any kind, Contractor/Subcontractor shall purchase and maintain, at its sole cost and expense, Professional

Liability (Errors and Omissions) insurance for all professional services provided. This Professional Liability insurance shall include full prior acts coverage sufficient to cover the services under this agreement, with the following minimum limits of liability:

\$1,000,000 per Claim/Annual Aggregate

Deductible or self-insured retention amount must not be greater than \$100,000 per claim, including coverage of contractual liability.

Professional Liability Insurance is to be maintained during the term of the contract and for so long as the insurance is reasonably available as provided herein, for a period of ten (10) years after completion of the services.

- E. Environmental and Asbestos Abatement Coverages:** If the Contractor's/Subcontractor's scope of work involves the removal of asbestos, the removal/replacement of underground tanks, or the removal of toxic chemicals and substances, the Contractor/Subcontractor will be required to provide the following minimum limits of liability, for such exposures subject to requirements and approval of the Owner:

\$1,000,000 per Claim/Aggregate

- F. Aircraft or Watercraft Liability Insurance:** If any Contractor/Subcontractor requires the use of Aircraft or Watercraft at the Project Site, the Contractor/Subcontractor shall purchase and maintain, or cause the operator of the Aircraft or Watercraft to purchase and maintain, Aircraft or Watercraft liability insurance. This must insure passengers and the General Public against personal injury, bodily injury or property damage arising out of the ownership, maintenance, use or entrustment to others. It includes Aircraft or Watercraft owned or operated by or rented or loaned to any insured. Use includes operation and "loading or unloading". Contractor/Subcontractor will be required to provide the following minimum limits of liability, for such exposures subject to requirements and approval of the Owner:

\$5,000,000 per Claim/Aggregate

1.8 REQUIRED CONTRACTOR/SUBCONTRACTOR CERTIFICATES OF INSURANCE AND ADDITIONAL INSURED ENDORSEMENTS

Certificates of Insurance and Additional Insured Endorsements acceptable to the Owner and Program Administrator must be filed with the Owner within ten (10) days after award of the contract to all Contractors/Subcontractors and prior to commencement of on-site activities.

All required insurance shall be maintained, without interruption, from the date of commencement of on-site activities, until the date of the final payment or expiration of any extended period, as set forth in this agreement. These certificates and additional insured endorsements required by Section 1.7 and 1.8 shall provide not less than thirty (30) days prior written notice to the Owner, with a copy to the Program Administrator, of any material change in the insurance, cancellation, or non-renewal.

Certificates of Insurance, the Project must be identified on the Certificate of Insurance in the "Description of Operations/Locations/Vehicles/Special Items" section. The Certificates of Insurance should name District, as the Certificate Holder, as specified below:

Certificate Holder:

Antioch Unified School District
c/o Statewide Educational Wrap Up Program (SEWUP)
2355 Crenshaw Blvd., Suite 200
Torrance, CA 90501

Additional Insured Endorsements: The Owner must be specifically named on the Schedule of an Additional Insured Endorsement, under the section titled, "Name of Person or Organization", as specified below:

1. **Antioch Unified School District, CM, Architect, Inspector, the State of California, their officers, employees, agents, volunteers, and independent contractors as additional insureds.**
2. All Contractors/Subcontractors must provide an additional insured endorsement for automobile liability.

Ineligible Contractors/Subcontractors must provide an additional insured endorsement on both the Automobile Liability and General Liability policies and a waiver of subrogation on workers' compensation.

Antioch Unified School District

c/o Statewide Educational Wrap Up Program (SEWUP)
2355 Crenshaw Blvd., Suite 200
Torrance, CA 90501

1.9 CONTRACTOR/SUBCONTRACTOR INSURANCE FOR PERSONAL PROPERTY AND EQUIPMENT

All Contractors/Subcontractors shall be solely responsible for any loss or damage to their personal property including, without limitation, their tools and equipment, mobile construction equipment, scaffolding, and temporary structures, whether owned, borrowed, used, leased, or rented by any Contractor/Subcontractor. Contractors/Subcontractors may at their sole discretion, purchase and maintain insurance or self-insure such equipment and property, and any deductible in relation thereto shall be their sole responsibility. Any insurance, including self-insurance, shall be the Contractors'/Subcontractors' sole source of recovery in the event of a loss.

Any type of insurance or any increase of limits of liability not described in this Section, which the Contractors/Subcontractors require for their own protection or on account of any statute, will be their own responsibility and at their expense.

1.10 ASSIGNMENT OF RETURN PREMIUMS

The Owner will be responsible for the payment of all premiums associated solely with the OCIP and will be the sole recipient of any dividend(s) and/or return premium(s) generated by the OCIP.

1.11 WAIVER OF SUBROGATION AND OWNER INDEMNIFICATION

With respect to their work on the Project:

1. Owner waives all rights of subrogation and recovery against the Contractors/Subcontractors for any loss or damage which is insured under the OCIP.
2. Contractors/Subcontractors waive all rights of subrogation and recovery against the Owner and other Contractors/Subcontractors for any loss or damage which is insured under the OCIP.
3. The Contractors/Subcontractors are obligated to indemnify the Owner for damages or claims not covered by the OCIP.

1.12 NO RELEASE

The provision of the OCIP by the Owner will in no way be interpreted as relieving the Contractors/Subcontractors of any other responsibility or liability under this agreement or any applicable law, statute, regulation, or order.

1.13 OWNER'S RIGHT TO AUDIT

The Contractor/Subcontractor will permit the Owner and/or its representative to examine and/or audit its books, records, and insurance policy information. Contractor/Subcontractor will also provide any additional information to the Owner, or its appointed representatives, as may be required.

1.14 DUTIES IN THE EVENT OF A LOSS

Contractors/Subcontractors are required to report all losses and potential losses promptly to OCIP insurers and/or Program Administrator. A full description and details of the incurred loss are also required.

The Contractor/Subcontractor shall assist the Owner, its agents, and the Program Administrator, by providing the utmost cooperation in the adjustment of claims arising out of the operations conducted under, or in connection with, the Project and shall cooperate with the Owner's insurers in claims and demands that arise out of the Project and that the insurers are called upon to adjust.

In the event of an accident, it shall be the responsibility of the employing and/or responsible Contractor/Subcontractor to see that injured workers or members of the public are provided immediate medical treatment. All appropriate medical and claim forms must be filed in accordance with the claim procedures developed for this Project by Keenan & Associates, hereinafter called "Program Administrator." This includes notification to the appropriate state authorities, if necessary.

1.15 OCCUPATIONAL SAFETY AND HEALTH COMPLIANCE

All Contractors/Subcontractors are expected to comply with all applicable local, state, and federal occupational safety and health requirements. If additional safety and health requirements are set forth in the contract specifications, all contractors shall comply with these requirements.

It is the responsibility of each Contractor/Subcontractor to maintain an environment free of recognized hazards. All Contractors/Subcontractors shall exercise reasonable care to prevent work-related injuries; property and equipment damage at the Project, as well as minimize risk to the public and third-party property.

The Program Administrator shall conduct periodic loss control surveys on behalf of the District. These surveys will focus on evaluating the Contractors'/Subcontractors' efforts to minimize loss, assist in identifying loss exposures, and to recommend appropriate corrective measures. The Program Administrator is a resource to supplement the safety and loss prevention activity of Contractors/Subcontractors. Its loss control survey activities or other activities of the Program Administrator and/or OCIP insurers do not in any way relieve the Contractors/Subcontractors of their responsibilities for Project safety.

1.16 PROJECT SAFETY PROGRAM

In addition, local, state, and federal occupational safety and health laws, the following standards apply to all Enrolled and Non-Enrolled Contractors/Subcontractors.

A. Safety Orientation

1. Contractor/Subcontractor employees shall be provided with a project specific safety orientation prior the start of the project. At a minimum, the orientation will address the following items:
 - a. The District's site safety requirements.
 - b. Site specific safety hazards and protective measures for these hazards.
 - c. Emergency telephone numbers and procedures.
 - d. Local medical clinic/hospital information within the Medical Provider Network (MPN).

B. Program Management

1. Each Contractor/Subcontractors shall have the following safety programs:
 - a. Injury and Illness Prevention Plans
 - b. Hazard Communication Programs
 - c. Heat Illness Prevention Plans

2. Each Contractor/Subcontractor shall have an onsite competent person responsible for occupational safety and health. A competent person is one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

C. Mandatory 6' Fall Protection

1. Contractor/Subcontractor employees shall be protected from fall exposures of 6 feet or greater. Activities include but are not limited to:
 - a. Steel erection
 - b. Roofing
 - c. Framing
 - d. Decking
 - e. Work performed from scaffolds
 - f. Work performed from ladders

Exceptions: The following exceptions apply only to framers and wood frame activities:

- a. When installing or “rolling” the joists, Cal/OSHA fall protection requirements shall govern.
 - b. When framers are walking/working on securely braced joists, rafters, or roof trusses on center spacing not exceeding 24 inches, and more than 6' from an unprotected side or edge, they shall be considered protected from falls between the joists, rafters, or roof trusses.
2. A safety monitor as means of fall protection is prohibited.
 3. Ladder jacks and lean-to scaffolds are prohibited.
 4. Contractor/Subcontractors are required to provide training to their employees who might be exposed to a fall hazard prior to the exposure or upon hiring. This training shall be documented and available for review.
 5. Methods of fall protection include but are not limited to the following:
 - a. Railings
 - b. Covers for Floor, Roof, and Wall Openings
 - c. Personal Fall Arrest Systems, Personal Fall Restraint Systems, and Positioning Devices
 - d. Controlled Access Zones
 6. The design and construction of railings shall conform to the Cal/OSHA Construction Safety Orders.
 7. The use of wire ropes as top rails and intermediate rails of guardrail systems used for perimeter protection, or at interior openings such as stairways and elevator shafts, shall be installed in accordance with Cal/OSHA requirements. Additionally, wire ropes shall be secured to each support and taut at all times. The maximum deflection of the top rail when a load of 200 pounds is applied in any direction at any point of the top rail shall not exceed 3 inches in one direction which includes the free hanging sag in the wire rope.
 8. The minimum parapet height allowed for fall protection is 42 inches or greater.
 9. Covers used to cover floor, roof, and wall openings shall be secured in place to prevent accidental removal or displacement and shall be marked in accordance with Cal/OSHA Construction Safety Orders.
 10. Covers used to cover floor and roof openings shall be capable of safely supporting the greater of 400 pounds or twice the weight of the employees, equipment and materials that may be imposed on any one square foot area of the cover at any time.

11. Controlled access zones shall be defined by a control line or other means that restricts access. Each line shall have a minimum breaking strength of 200 pounds. Signs shall be posted to warn unauthorized employees to stay out of the controlled access zone.
12. Control lines shall consist of ropes, wires, tapes, or equivalent materials. Control lines shall be erected and supported in accordance with Cal/OSHA Construction Safety Orders.
13. Scaffold Access/Egress. An internal ladder system with hatches and drop-down ladders or temporary stairs shall be provided for safe access/egress on all scaffolds 20 feet or greater in height. External straight ladders are prohibited on all scaffolds if it exposes a user to a fall of 20 feet or greater in height. Exception: When adjustable scaffolds are utilized.
14. When adjustable scaffolds are utilized, they shall have rest platforms at 20-foot maximum vertical intervals.

D. Site Safety

According to industry practices, it is the responsibility of contractors of all tiers to exercise reasonable care to prevent work-related injuries; property and equipment damage at the project site, and to minimize risk to the third-party persons and property. Contractors/Subcontractors of all tiers shall be expected to comply with the following safety and loss control requirements:

1. All Subcontractors shall identify their contact person(s) to the General or Prime Contractor.
2. All Contractors/Subcontractors shall follow District procedures for dealing with the media.
3. At all times, hard hats shall be worn in the construction environment. Hard hats shall meet the requirements of ANSI Z89.1. No modification to the shell or suspension is allowed except when such changes are approved by the manufacturer.
4. 100% protective eyewear with side shield protection is required while in the construction environment, shop, or anytime eye hazards exist. Protective eyewear shall bear a legible and permanent "Z87" logo to indicate compliance with applicable ANSI/ASSE Standard.
5. All construction employees shall wear clothing suitable for the weather and work conditions. At a minimum, this shall be short sleeved shirts, long pants, and leather or other protective work shoes or boots.
6. Alcohol is prohibited on District property always.
7. Contractors/Subcontractors will be required to respond to all District complaints about objectionable levels of dust or noise and will be required to provide prompt and appropriate abatement.
8. Construction personnel cannot enter District grounds other than the construction site unless accompanied by District personnel and are allowed only "incidental" contact with students. Violations of these requirements by any construction employee will result in a mandatory background check of that employee – including fingerprinting – as required by state law.
9. All prime contractors must attend the site-specific pre-construction meeting.
10. No sexual reference or preference shall be permitted on any piece of clothing or the hardhat. Any employee observed disregarding this policy shall be removed from the job site until further notice.
11. Contractors and subcontractors at all times shall keep premises free from debris such as waste, rubbish, and excess materials and equipment caused by contract work. Contractors and subcontractors shall not leave debris under, in, or about the premises. Upon completion of the contract work, contractors and subcontractors 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. Contractors and subcontractors 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 the site. No glass containers are permitted on the site.

12. Theft or willful damage to any property of the District, student, or other contractors will be prosecuted fully.
13. All Contractors/Subcontractors will advise non-English speaking employees in their native language either in a written format or via an interpreter of these policies.

E. Crane Safety

1. In accordance with Title 8, California Code of Regulations, section 5006.1, employers shall only permit operators who have a valid certificate (license) of competency to operate cranes. The operator shall have his license on his person, readily available for review.
2. All cranes used in lifting service, exceeding 3 tons rated capacity, and their accessory gear shall not be used until the employer has ascertained that such equipment has been certificated in accordance with Cal/OSHA as evidenced by current and valid documents. Certificates (annual and quadrennial) attesting to current compliance with testing and examination standards shall be maintained, readily available for each crane.
3. The contractor shall provide an erection plan and procedure for erection of trusses and beams over 25 feet long. The erection plan and procedure shall be prepared by a civil engineer currently registered in California. This plan and procedure shall be followed and kept available on the job site.

F. Fire Prevention During Welding, Cutting, and Other Hot Work

1. Contractors engaged in welding and allied processes, heat treating, grinding, cutting, thawing pipe, powder-driven fasteners, hot riveting, torch-applied roofing in conjunction with the requirements of NFPA 241, and similar applications producing or using a spark, flame, or heat shall adhere to National Fire Protection Association Standard 51B entitled "Standard for Fire Prevention During Welding, Cutting, and Other Hot Work."

G. Incident Investigation Requirements

1. The contractor shall perform thorough, in-depth investigations and evaluations of all incidents. A formal incident investigation shall be conducted whenever any incident occurs, including, without limitation, both non-injury incidents and incidents involving first aid. Additionally, near miss accidents and/or incidents must be reported and undergo the same in-depth investigation, root cause analysis and lessons learned process. The incident investigation report shall be e-mailed to Keenan and Associates within 5 working days.
2. Recommendations and lessons learned to prevent recurrence of incidents shall be documented and communicated to all employees of contractor and subcontractors through safety meetings and on-the-job training.

H. Return to Work:

1. The District and OCIP Carrier are committed to working with all Enrolled Contractors and Subcontractors to promote the successful & timely return to work of injured employees following a work-related injury. The purpose of this policy is to ensure that Enrolled Contractor/Subcontractor employees who temporarily cannot return to their normal duties due to job-related injury or illness but can safely perform transitional duties while recovering is offered appropriate transitional duties for a limited time only.
 - a. An employee who has experienced a job-related injury requiring medical treatment must provide a proper medical release prior to returning to work.

- b. An employee who has been removed from the jobsite ambulatory must provide a proper medical release prior to returning to work.
- c. Each Enrolled Contractor/Subcontractor will cooperate with the OCIP Carrier to facilitate the return to work of any injured employee capable of safely performing transitional duties.
- d. When the employee is released to transitional duties, it is the Enrolled Contractor/Subcontractor's responsibility to facilitate the injured employee's return to work.
- e. The Enrolled Contractor/Subcontractor is expected to accommodate the injured employee and facilitate the return to work.
- f. It will be the responsibility of the insurance carrier to maintain communication with the treating physician and the Enrolled Contractor/Subcontractor to facilitate the prompt return of an employee to full work status.

I. Conflicting Safety Requirements:

Contractors and subcontractors shall adhere to all applicable federal, state, local, and contractual safety and health requirements. If there is a conflict between any of these safety and health requirements, the most stringent requirement shall apply.

J. Noncompliance and Unsafe Practices

Owner or their representative shall have the authority to immediately cease any and all operation (s) on the jobsite that is deemed by Owner or their representative to be unsafe to property or has the potential to cause Bodily Injury, pursuant to Title VIII California Code of Regulation, Section 1511. Any such cession of work shall not constitute recoverable delay or other contractual remedies for liquidated damages and may expose the offending contractor to any such losses to the District or other trades.

K. Professional Conduct Clause

Contractors and subcontractors shall at all times adhere to safety requirements (contractual and regulatory) and shall encourage safe and professional behavior among their employees. Contractor and subcontractors shall not allow on the job site any unfit person, unsafe person, anyone unskilled and unqualified to perform the work assigned to them, or anyone exhibiting such qualities. Any person in the employ of the contractor or subcontractor whom the District or the District's agent/representative may deem incompetent, unsafe, or unfit shall be immediately dismissed from the OCIP job site and shall not again be allowed on the OCIP the job site except with the written consent of District or the District's agent/representative. The District reserves the right to request that the contractor or subcontractor's assigned Project Supervisor/Manager be replaced immediately.

1.17 OWNER'S INSURANCE OBLIGATIONS; CONTRACTORS'/SUBCONTRACTORS' OBLIGATIONS; REPRESENTATIONS, WARRANTIES AND DISCLAIMERS

(a) Owner assumes no obligation to provide insurance other than that summarily described in these Contractual Provisions, in the Project Insurance Manual, and in the OCIP insurance policies. Contractor/Subcontractor shall review the OCIP coverages, limits of liability, and insurance policies to satisfy themselves that the coverages offered thereby meet its needs. Nothing contained herein shall be deemed to place any responsibility on Owner, and Owner disclaims any responsibility, for ensuring that the insurance provided by the OCIP is sufficient for the conduct of Contractor's/Subcontractor's business or performance of the Work, including, without limitation, the adequacy of the limits of liability provided by, and as to all other terms, conditions, and exclusions of, the OCIP insurance policies. The furnishing of insurance by Owner through the OCIP shall in no way relieve or limit or be construed to relieve or limit Contractor/Subcontractor of any responsibility, liability or obligation imposed by the contract, the contract

documents, the Project Insurance Manual, the OCIP insurance policies, or by law, including, without limitation, all indemnification obligations on the part of Contractor/Subcontractor.

(b) By enrolling in the OCIP, Contractor/Subcontractor acknowledge that (i) the limits of liability of the OCIP insurance policies are shared by all insured parties under the OCIP; (ii) Owner is not an insurer or in the business of insurance and is not an agent, broker, partner or guarantor of Contractor/Subcontractor or any of the insurance companies providing coverage under the OCIP (the "OCIP insurers"); and (iii) Owner is not responsible for (a) the availability, adequacy, or exhaustion of the limits of the OCIP, (b) the present or future solvency of any of the OCIP insurers or (c) any claims or disputes by, between or among Owner, Contractor/Subcontractor and any of the OCIP insurers, including, without limitation, claims or disputes arising out of any the OCIP insurers' payment or nonpayment of claims or losses, or such insurers' contractual or extra-contractual duties, including, without limitation, defense and/or indemnity obligations. Any type of insurance coverage or limits of liability not provided by the OCIP which Contractor/Subcontractor desires for its own protection, or which is required by applicable laws or regulations, shall be its sole responsibility and expense and shall not be included in its compensation for performance of the contract work. If Contractor/Subcontractor believes that additional limits of liability beyond those provided by the OCIP would be prudent for its protection, it agrees to investigate and procure such additional limits of liability for itself at its sole cost.

(c) By enrolling in the OCIP, Contractor/Subcontractor represents and warrants that it has had the opportunity to read and analyze (and to obtain professional assistance to read and analyze) a copy of the OCIP insurance policies and understand the contents thereof. Any reference in these contractual provisions, in the Project Insurance Manual, or elsewhere in any contract document as to amount, nature, type or extent of coverage provided under the OCIP and/or potential applicability to any potential claim or loss is for reference only and Contractor/Subcontractor represents and warrants that it has not relied upon any such reference or any other oral or written statement by or on behalf of Owner, the Project Administrator, or any of its or their agents, employees or representatives, but solely upon its own independent review and analysis of the OCIP insurance policies in formulating any understanding and/or belief as to amount, nature, type or extent of any coverage, conditions, extensions, or limits of liability provided by and as to all other terms of the OCIP insurance policies and/or their potential applicability to any claim or loss or their sufficiency for the conduct of Contractor's/Subcontractor's business or performance under the contract documents. To the extent that Contractor/Subcontractor deems it prudent to secure and maintain additional, supplemental, excess, or wholly independent insurance or liability associated with its work on the Project or otherwise, it shall be responsible to do so at its sole expense.

(d) Contractor/Subcontractor hereby releases Owner, the Program Administrator and their respective representatives, agents, directors, officers, employees, partners, shareholders, members, affiliates of every tier, successors, and assigns from any and all claims and liabilities arising out of or relating to acts, errors, omissions or negligence (i) in the design, selection, placement, adequacy, amount, limits, scope and nature of insurance coverage afforded by the OCIP, (ii) in the selection, performance and present and future solvency of the OCIP insurers, and (iii) in the implementation and administration of the OCIP. Contractor/Subcontractor shall make its own determinations regarding such matters and expressly waives all rights and benefits conferred upon it by the provisions of California Civil Code Section 1542, which provides:

"A general release does not extend to claims that the creditor or releasing party does not know or suspect to exist in his or her favor at the time of executing the release and that, if known by him or her, would have materially affected his or her settlement with the debtor or released party."

Contractor/Subcontractor expressly acknowledges that the foregoing waiver of the provisions of Section 1542 was separately bargained for, and expressly agrees that the release provision shall be given full force and effect, including, without limitation, as to unknown or unsuspected claims, demands, liabilities and causes of action,

if any may exist or arise. This release provision shall survive the completion of the contract work and the expiration or other termination of the Agreement.

1.18 JOINT DEFENSE OF CLAIMS AND SUITS AGAINST MORE THAN ONE INSURED

(a) If a claim, demand, suit, or other proceeding (“Claim”) is brought against more than one insured under the OCIP, Owner and Contractor/Subcontractor recognize the common interest of all OCIP insureds in jointly defending that Claim. To the fullest extent permitted by law, and absent a material, current, actual, conflict of interest that cannot be waived and which mandates the appointment of separate counsel under applicable law, Owner and Contractor/Subcontractor insured under the OCIP (i) shall be defended by the same counsel and by the same consultants and experts selected by Owner and/or the OCIP insurers at its or their sole discretion, regardless of whether the defense under the OCIP is provided subject to a reservation of rights issued by any OCIP insurer, and (ii) waive their respective rights to independent counsel as to any and all such Claims. This waiver is deemed to be continuing. Contractor/Subcontractor agrees to execute such other documents as are required to effectuate this waiver and fulfill the purpose of this Section 1.18.

(b) In defense of Claims arising under the OCIP, information shared with counsel engaged to defend the insureds (“Defense Counsel”) will be protected from disclosure and shall remain privileged even after the termination of the OCIP and/or the completion of the Project. Contractor/Subcontractor agrees not to disclose to any person or entity, other than to Owner and to Defense Counsel, any confidential information obtained in the defense or pursuit of Claims covered, or potentially covered, under the OCIP. Any such confidential information shall only be used in matters that arise directly pursuant to such OCIP Claims. However, disclosures of such confidential information may be made (i) upon written approval from Defense Counsel or (ii) where required by court order or by applicable law.

(c) Nothing in this Section 1.18 shall preclude Contractor/Subcontractors from engaging counsel of its choice, at its sole expense, to associate in the defense of any such Claim.

1.19 Duty of Care

Nothing contained in the OCIP insurance policies, the contract, these contractual provisions, any other contract document, or the Project Insurance Manual shall relieve Contractor/Subcontractor of its obligations to exercise due care in the performance of its duties in connection with the contract work and to complete the contract work in strict compliance with the contract documents.

NOTE: THE OWNER AND PROGRAM ADMINISTRATOR MUST APPROVE CHANGES TO ANY OCIP REQUIREMENT OR PROCEDURE. NO CONTRACTOR OR SUBCONTRACTOR HAS THE AUTHORITY TO AMEND THE OCIP REQUIREMENTS.

OCIP EXHIBIT A

PROTECTIVE SAFEGUARDS

APPLICABLE TO 'WOOD FRAME' PROJECTS ONLY:

The Builders Risk Policy will not pay for LOSS caused by or resulting from exposures, if the applicable protective safeguards are not maintained during the Builders Risk Policy term of INSURED PROJECT.

As a condition precedent to fire, theft, vandalism, and malicious mischief coverage provided by the Builders Risk Policy, the following protective safeguards will be maintained at every INSURED PROJECT site of Wood Frame construction insured by the Builders Risk Policy.

1. **Fencing** – The entire INSURED PROJECT site shall be surrounded with a six foot chain link fence suitably anchored in the ground and placed a reasonable distance from the insured property. Gates through the chain link fence shall be securely locked during non-working hours.
2. **Lighting** – The entire INSURED PROJECT site shall be illuminated from sunset to sunrise, each day.

**Wood Frame Projects with total insured values greater than \$15M may also be required to provide the following:

- Electronic Security – Electronic security by a contracted service from a surveillance company that owns and operates a UL-certified, North American based monitoring center. The surveillance system must be cloud-based and operational covering 100% of the INSURED PROJECT site utilizing infrared illumination or thermal imaging cameras. The electronic security system must have the following capabilities:
 - Live audible voice-over functionality;
 - Lighting or visual indication features;
 - Four hour back up battery life in the event AC power is lost.

EXHIBIT B



www.sewup.org

Statewide Educational Wrap Up Program (SEWUP) JPA Owner Controlled Insurance Program (OCIP)

Project Insurance Manual

This manual is intended to provide only a general overview of the Owner Controlled Insurance Program and does not in any way alter or take precedence over the language in the actual insurance policies and contracts. It makes no promise to provide insurance to those not enrolled in the Owner Controlled Insurance Program

Program Administrator:

*Keenan & Associates
SEWUP Department*

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Preface

This Manual

- Identifies responsibilities of the various parties involved in the project
- Provides a basic description of the OCIP coverage and program structure
- Describes audit and administrative procedures
- Provides answers to basic questions about the OCIP
- Provides claim reporting procedures
- Will be updated as necessary

This Manual Does Not

- Provide OCIP coverage interpretations
- Provide complete information about OCIP coverages (Refer to OCIP policies)
- Provide answers to specific claims questions

1.0 Introduction

The Statewide Educational Wrap Up Program JPA (SEWUP), of which this school district is a member, is providing an Owner Controlled Insurance Program (OCIP) for work performed at specific project sites, on behalf of the district, (herein referenced as the “District” or the “Owner”). The OCIP is an insurance program that insures eligible and enrolled subcontractors, for work performed at the Job Site (at times referenced herein as the “Work”). **Keenan & Associates**, hereinafter called “Program Administrator”, will administer the OCIP on behalf of the SEWUP JPA.

Certain subcontractors are excluded from this OCIP. These parties are identified in the Contract Documents and Section 3 (Definitions) of this manual.

The Owner / District will pay the insurance premiums for the OCIP coverage described in this manual. You should notify your insurer(s) to endorse your coverage to be excess and contingent over the insurance provided under this OCIP for on-site activities and the related costs. Each bidding prime or general contractor (“Contractor”) and subcontractors of every tier (“Subcontractor”) is required to exclude from its bid price and requests for payment the cost of insurance coverages that will be provided by the OCIP.

Note

The guidelines in this manual are to be used for informational purposes only. This manual does not constitute a contractual agreement. If conflicts exist between this manual and OCIP Insurance Policies, or this manual and the Contracts between the District, Construction Manager, and Contractor (Enrolled Parties), the OCIP Policies or Owner’s Contracts will govern.

1.1 Participation & Contractor Compliance

Participation in the OCIP is mandatory but not automatic. Enrollment eligibility will be determined upon completion of an online enrollment form which will include documentation of trade, scope of work, estimated value, estimated start and completion. All Contractors and Subcontractors of all tiers must register via the OCIP’s online portal (“WrapPortal”) (www.keenanwrap.com) and adhere to all program requirements, as specified in [Section 5.0](#).

The program Administrator will provide a User Name, Password and URL for website enrollment to each subcontractor upon entry of Subcontractor identifying information into WrapPortal by its Contractor or Parent Subcontractor.

Enrollment of each Contractor’s eligible Subcontractors is mandatory. Contractor shall notify Owner and the Program Administrator in writing of the identity of each Subcontractor regardless of enrollment eligibility and shall cause each Subcontractor to notify the Program Administrator in writing of the identity of each of its Sub-subcontractors, prior to such parties’ commencement of their portion of the Work and prior to their entry onto the Project. Contractors and subcontractors of all tiers shall not be deemed enrolled until the Program Administrator and OCIP insurers receive and approve a completed Contract Enrollment Form, for each awarded contract. Enrollment is required prior to commencement of on-site activities but no contractor shall be enrolled sooner than 30 days prior to their start date. Each Contractor/Subcontractor shall be solely responsible for any and all losses, damages, claims, liabilities, and suits arising out of such Subcontractor’s failure to enroll, or delay in enrolling, any of its Subcontractors.

Enrollment (Definition): An Eligible Subcontractor is considered Enrolled once all required documents are received, reviewed and processed by the OCIP Program Administrator and Insurer.

1.2 Subcontractor Eligibility

A. Eligible

Includes all Contractors and Subcontractors providing direct labor on the Project and excludes Ineligible contractors as defined below. Temporary labor services and leasing companies are to be treated as Eligible Contractors.

B. Ineligible Contractor (Excluded)

It is not the intent to insure certain entities and scopes of work, including, but not necessarily limited to the following: consultants; suppliers; abatement and/or removal of hazardous materials; vendors; off-site fabricators; materials dealers; surveyors; guard services; non-construction janitorial services; and truckers, including trucking to the Project where delivery is the only scope of work performed; and contractors performing landscape maintenance (though landscape work itself is covered). Ineligible parties are required to ensure that any eligible subcontractors who provide on-site labor comply with the OCIP Enrollment and are provided with a copy of this OCIP Manual. Program Administrator reserves the right to reconsider an ineligible entity's participation in the OCIP should its scope of work or contract change at any time. Ineligible contractors will be required to adhere to insurance certificate requirements as stated in section [4.0, under Contractor-Provided Insurance Coverage](#). In addition, any party deemed an Ineligible Contractor, but who has direct labor on the Project, will be required to participate in the Project Safety Program ([see Section 6.0](#)).

Any questions regarding a Subcontractor's status as "Eligible" or "Ineligible" should be referred by written request to Contractor and Owner and approved by the Program Administrator.

1.3 Project Site and Offsite Premises

Coverages provided by the OCIP are Project Site specific. The Project-Site must be designated by the Owner. The Project Site consists of any and all projects that are endorsed to this policy, which includes the:

1. Ways and means adjoining the endorsed project site.
2. Adjacent locations to the endorsed projects sites where incidental operations are being performed, excluding permanent locations.

With the exception of 1 and 2 mentioned above, off-site locations, labor and operations are not covered by the OCIP. It will be the responsibility of each contractor to maintain off-site insurance, as identified in Section 4.3, which specifies coverage types and minimum limits. Contractor will promptly furnish to the Owner, or their designated representative, Certificates of Insurance evidencing that all required insurance is in force.

2.0 Information Directory

2.1 Program Administrator

Keenan & Associates – SEWUP Department

2355 Crenshaw Blvd., Suite 200

Torrance, CA 90501

Phone: 800.654.8102

Questions Regarding OCIP

Refer questions concerning the OCIP and its administration or coverages to the Program Administrator. Answers to questions may also be found in [Section 9.0 - Frequency Asked Questions](#).

2.2 Insurance Companies

Workers' Compensation

General Liability

Excess Liability

Liberty Mutual Insurance

Lloyd's of London

Lloyd's of London

Endurance American Specialty Insurance Company

Crum & Forester Specialty Insurance Company

Texas Insurance Company

Fair American Select Insurance Company

Great American Assurance Company

Starr Surplus Lines Insurance Company

Westchester Surplus Lines Insurance Company

Navigators Specialty Insurance Company

Builder's Risk

Illinois Union Insurance Company

Contractor's Pollution Liability

Berkley Assurance Company

See Section 6 For Claims Reporting Instructions and Procedures.

3.0 OCIP Coverages

Description of Owner Controlled Insurance Program (OCIP) Coverages

The OCIP is for the benefit of the Owner and all Enrolled Contractor/Subcontractors who have on-site employees. OCIP coverage applies only to Work performed under the contract at the Project Site specified by the Owner. All Contractors must provide their own insurance for Automobile Liability and off-site locations, labor, and operations. The following coverages are provided by the OCIP:

Workers' Compensation and Employers Liability

Commercial General & Excess Liability

Builder's Risk

Contractor's Pollution Liability

A Certificate of Insurance evidencing workers' compensation & employer's liability, general and excess liability and pollution liability insurance will be issued to each contractor that is enrolled for

coverage in the OCIP (“Enrolled Party”) via WrapPortal. Other documentation including forms, posting notices, etc., will be provided to each Enrolled Party.

OCIP Disclaimer

The OCIP is intended to provide broad coverages and high limits, to all Enrolled Contractors/Subcontractors. The Owner does not warrant or represent that the OCIP coverages constitute an insurance program that completely addresses the risks of the Contractors/Subcontractors. Prior to contract award, it is the responsibility of all Contractors/Subcontractors to ensure that the OCIP coverages provided sufficiently address their insurance needs. Upon request, OCIP policies are available for review.

3.1 Workers’ Compensation and Employer’s Liability Insurance

Workers’ Compensation and Employer’s Liability Insurance will be provided in accordance with applicable state laws to all Enrolled Contractors/Subcontractors (each as a named insured, and issued an individual policy) reflecting the following Limits of Liability:

Coverage A – Workers’ Compensation

Liability imposed by the Workers’ Compensation and/or Occupational Disease statute of the State of California or governmental authority having jurisdiction related to the work performed on the Project.

Coverage B – Employers Liability

\$1,000,000 Bodily Injury each Accident

\$1,000,000 Bodily Injury by Disease – Policy Limit

\$1,000,000 Bodily Injury by Disease – Each Employee

Contractor Deductible: None

Exclusions: The known exclusions for this coverage are listed in [Section 10.0 – Known Policy Exclusions](#). This is a summary and may not be exhaustive. The policy language may contain additional exclusionary language, limitations or carve-backs that may not be identified in the list. It is the responsibility of the Contractor/Subcontractor to review the policy for the complete details of all exclusions.

Policy Term: The master policy effective date is October 1, 2023. The policy term is three years, with automatic one-year renewals until the Project is completed. The policy is intended to remain in effect for duration of the contractor’s contractual work. Warranty work and post contract repair work are excluded. The policy is intended to remain in effect for the length of the Project or the policy end date, whichever comes first.

3.2 Commercial General Liability & Excess Liability Insurance

All Enrolled Contractors/Subcontractors are considered Named Insureds under SEWUP’s Master General & Excess Liability policies. The Master Policies are available for review by Contractors/Subcontractors, upon request to the Owner or the Program Administrator.

Primary Coverage: Total Limits for Bodily Injury and Property Damage

\$125,000,000 Each Occurrence

\$195,000,000 General Annual Aggregate

\$125,000,000 Products and Completed Operations Aggregate

- Ten (10) year Products and Completed Operations Extension after project completion with a single non-reinstated aggregate limit.

Policy Forms: “Occurrence” Form

Contractor Deductible: None

Conditional Warranty:

Subsidence: It is expressly warranted that the Named Insured and all Contractors and Sub-Contractors comply with all recommendations contained in the geotechnical/ environmental reports. Failure to comply will result in subsidence coverage being null and void and a full subsidence exclusion would be re-instated.

EIFS Installation Agreement

The following terms and conditions shall be satisfied in connection with all EIFS work on any Project:

1. EIFS work is to be specifically identified and its value declared.
2. All EIFS work will be monitored by an independent EIFS inspection company to document compliance with manufacturers' handling and installation instructions.
3. EIFS product manufacturers and warranty providers will be identified and provided to the Owner.

Exclusions: This insurance does not provide coverage for products liability of any enrolled party for any product manufactured, assembled or otherwise worked upon away from the Project Site.

The known exclusions for this coverage are listed in Section 10.0 – Known Policy Exclusions. This list is a summary and may not be exhaustive. The policy language may contain additional exclusionary language, limitations or carve-backs that may not be identified in the list. It is the responsibility of the Contractor/Subcontractor to review the policy for the complete details of all exclusions.

Policy Term: The master policy effective date is October 1, 2023. The policy is intended to remain in effect for the length of the Project or through October 1, 2028 at 12:01am, whichever comes first.

3.3 Builder's Risk Insurance

The Builders Risk Master Policy names the Owner as named insured and enrolled Contractors/Subcontractors as additional insureds. This Master policy is available for review by Contractors/Subcontractors, upon request to the Owner or the Program Administrator.

Primary Coverage: Builders Risk coverage will be in place during the course of construction of the Project. Such insurance shall be written on a repair or replacement cost basis, subject to exclusions, sub limits, property limitations and conditions. The policy covers materials, supplies, equipment, fixtures, or machinery, which will become a permanent part of the building or structure at the Project site specified, limited to policy terms, limits, and exclusions.

Deductible: A deductible, which shall be determined by the type of construction, will apply to each occurrence. The deductible schedule is as follows:

New Construction & Renovation

- \$5,000 - \$50,000 deductible (depending on type of structure) for Wood Frame, Masonry Non-Combustible or Joisted Masonry, and Fire Resistive / Non-Combustible.
- Up to \$100,000 deductible for Water Damage to All Construction Classifications.
- Deductibles are subject to increase if a Project's Builder's Risk term is extended 60 days or more

Contractor Deductible: Contractor/Subcontractors shall be responsible for the applicable deductible. The deductible shall apply to each occurrence and must be satisfied prior to payment of the loss. **The deductible shall not be reimbursed by the OCIP Insurance Program or the District.**

Exclusions: The known exclusions for this coverage are listed in [Section 10.0 – Known Policy Exclusions](#). This is a summary and may not be exhaustive. The policy language may contain additional exclusionary language, limitations or carve-backs that may not be identified in the list. It is the responsibility of the Contractor/Subcontractor to review the policy for the complete details of all exclusions.

Policy Term: The policy term is the term of the project.

Note:

All Contractors'/Subcontractors shall be responsible for any loss or damage to their personal property. This would include, but is not limited to, tools, equipment, mobile construction equipment, or materials NOT intended to be a permanent part of the building, whether owned, borrowed, used, leased, or rented by any Contractor/Subcontractor. Any insurance purchased by the Contractors/Subcontractors, or self-insurance, shall be the Contractors'/Subcontractors' sole source of recovery in the event of a loss.

3.4 Contractor's Pollution Liability Insurance

Contractor's Pollution Liability is written on an "Occurrence" form under a master liability policy. This Master policy is available for review by Contractors/Subcontractors, upon request to the Owner or the Program Administrator. Certificates of Insurance will be provided to all enrolled Contractors/Subcontractors, as named insured.

Primary Coverage: Bodily Injury or Property Damage from a pollution event as defined within the policy form resulting from covered operations or completed operations.

Limits: \$15,000,000 Per Occurrence / \$25,000,000 Policy Aggregate
Defense costs included within limits

Deductible: \$10,000 Per Occurrence

Contractor/Subcontractor shall be liable, at its expense; to the extent claims payable are attributable to their acts or omissions and/or the acts or omissions of its Subcontractors of any tier or any other entity or person for whom it may be responsible. The deductible amount shall not be reimbursed by the OCIP Insurance Program or the District.

Exclusions: The known exclusions for this coverage are listed in [Section 10.0 – Known Policy Exclusions](#). This is a summary and may not be exhaustive. The policy language may contain additional exclusionary language, limitations or carve-backs that may not be identified in the list. It is the responsibility of the Contractor/Subcontractor to review the policy for the complete details of all exclusions.

Policy Term: The master policy effective date is October 1, 2023. The policy is intended to remain in effect for the length of the Project or through October 1, 2028, at 12:01am, whichever comes first.

3.5 OCIP Certificates

All Enrolled Contractors/Subcontractors will receive their own Workers' Compensation policy. Certificates of Insurance will be furnished for the General Liability, Excess Liability, Contractor's Pollution Liability, and Builder's Risk coverages. These policies are available for review by the Contractor/Subcontractor, upon request to the Owner or the Program Administrator. Such policies or programs may be amended from time to time and the terms of such policies or programs are incorporated herein by reference. Contractors/Subcontractors hereby agree to be bound by the terms of coverage, as contained in such insurance policies and/or self-insurance programs.

4.0 Contractor Required Insurance

For any work under this contract, and until completion and final acceptance of the work by the Owner, the Contractors/Subcontractors shall, at their own expense, promptly furnish required Certificates of Insurance and Additional Insured Endorsements acceptable to the Owner and Program Administrator. Copies should be provided to the Program Administrator via WrapPortal, for both Project Site and Off-Site operations, within ten (10) days after award of the contract to all Contractors/Subcontractors and prior to commencement of on-site activities.

All required insurance shall be maintained, without interruption, from the date of commencement of on-site activities, until the date of the final payment or expiration of any extended period. Certificates and additional insured endorsements shall provide not less than thirty (30) days prior written notice to the Program Administrator, of any material change in the insurance, cancellation or non-renewal.

The OCIP places contractors and subcontractors into one of two main categories: Enrolled Contractors or Ineligible (Excluded) Contractors.

4.1 Verification of Required Insurance Coverages

A. Enrolled Contractor/Subcontractors:

- **Certificates of Insurance** must be provided, evidencing Workers' Compensation & Employer's Liability, and General Liability, Excess/Umbrella Liability insurance for off-site activities, and Automobile Liability insurance for on and off-site activities as per the insurance specifications in the Contract.
- **Additional Insured Endorsements** for Auto Liability. These endorsements must name **the District** specifically as additional insured. If the insured's policy has a 'Blanket' Additional Insured Endorsement and cannot name any entity, provide a copy of the endorsement for our review.

B. Ineligible (Excluded) Contractors/Subcontractors:

- **Certificates of Insurance** must be provided, evidencing Workers' Compensation & Employer's Liability, General Liability, Excess/Umbrella Liability and Automobile Liability insurance for all activities including both on-site and off-site activities as per the insurance specifications in the Contract.
- **Additional Insured Endorsements** for General Liability and Auto Liability. These endorsements must name **the District** specifically as additional insured. If the insured's policy has a 'Blanket' Additional Insured Endorsement and cannot name any entity, provide a copy of the endorsement for our review.
- **Waiver of Subrogation** for Workers Compensation and General Liability in favor of the owner.

4.2 Contractor Maintained Insurance Coverage

*Indicates off-site required coverage / **Indicates off-site & on-site required coverage

A. Workers' Compensation and Employer's Liability Insurance*

- Enrolled & Ineligible/Excluded Contractors
- Required limits on Certificate of insurance are as follows:

Subcontractors

| | |
|------------------------------|--|
| Part 1: Workers Compensation | California Statutory Benefits |
| Part 2: Employer's Liability | |
| \$1,000,000 | Bodily Injury each Accident |
| \$1,000,000 | Bodily Injury by Disease – Policy Limit |
| \$1,000,000 | Bodily Injury by Disease – Each Employee |

- Ineligible/Excluded Subcontractors must also provide **Waiver of Subrogation** for Workers Compensation in favor of the owner.

B. General Liability Insurance*

- Enrolled & Ineligible/Excluded Subcontractors
- Minimum Required limits of insurance are as follows:

| General/Prime Contractor | Subcontractor | |
|--------------------------|---------------|---|
| \$2,000,000 | \$1,000,000 | Bodily Injury and Property Damage Liability Per Occurrence |
| \$2,000,000 | \$1,000,000 | General Aggregate |
| \$2,000,000 | \$1,000,000 | Products/Completed Operations Aggregate |
| \$2,000,000 | \$1,000,000 | Personal/Adv. Injury Liability Any One Person or Organization |

- It is recommended that the Designated Operations Covered by a Consolidated (Wrap-Up) Insurance Program (CG 21 31 05 09) endorsement be added to your primary general liability policy. This will ensure appropriate coverage for any off-site exposures associated with this OCIP project.

C. Automobile Liability Insurance**

- Enrolled & Ineligible/Excluded Subcontractors
- Must cover all vehicles owned by, hired by, or used on behalf of the Contractors/Subcontractors for both Project Site and off-site operations with the following minimum limits of liability:

| General/Prime Contractor | Subcontractor | |
|--------------------------|---------------|-----------------------------------|
| \$2,000,000 | \$1,000,000 | Bodily Injury and Property Damage |

D. Professional Liability Insurance**

- Enrolled & Ineligible/Excluded Subcontractors
- If Subcontractor's work requires design and/or design-assist services, or Subcontractor performs professional services of any kind, Subcontractor shall purchase and maintain, at

- its sole cost and expense, Professional Liability (Errors and Omissions) insurance for all professional services provided.
- Subcontractor's policy shall include full prior acts coverage sufficient to cover the services under this agreement, with the following minimum limits of liability:
\$2,000,000 per Claim/Annual Aggregate
- Deductible or self-insured retention amount must not be greater than \$100,000 per claim, including coverage of contractual liability.
- Coverage must be maintained during the term of the contract and for so long as the insurance is reasonably available as provided herein, for a period of ten (10) years after completion of the services.

E. Environmental and Asbestos Abatement Coverages**

- Ineligible Subcontractors
- If Subcontractor's scope of work involves the removal of asbestos, the removal/replacement of underground tanks, or the removal of toxic chemicals and substances, the Contractor/Subcontractor will be required to provide the following minimum limits of liability, for such exposures subject to requirements and approval of the Owner:
\$2,000,000 per Claim/Aggregate

F. Aircraft or Watercraft Liability Insurance**

- If any Subcontractor requires the use of Aircraft or Watercraft at the Project Site, the Subcontractor shall purchase and maintain, or cause the operator of the Aircraft or Watercraft to purchase and maintain, Aircraft or Watercraft liability insurance.
- Must insure passengers and the General Public against personal injury, bodily injury or property damage arising out of the ownership, maintenance, use or entrustment to others.
- Includes Aircraft or Watercraft owned or operated by or rented or loaned to any insured.
- Use includes operation and "loading or unloading". Contractor/Subcontractor will be required to provide the following minimum limits of liability, for such exposures subject to requirements and approval of the Owner:
\$5,000,000 per Claim/Aggregate

Please note, Drones are considered aircraft and coverage is expressly excluded from the OCIP policies.

4.3 Certificates of Insurance

The Project must be identified on the Certificate of Insurance in the "Description of Operations/Locations/Vehicles/Special Items" section. The Certificates of Insurance should name District, as the Certificate Holder, as specified below:

Certificate Holder:

Antioch Unified School District
c/o Statewide Educational Wrap Up Program (SEWUP)
2355 Crenshaw Blvd., Suite 200
Torrance, CA 90501

4.4 Additional Insured Endorsements

The Owner must be specifically named on the Schedule of an Additional Insured Endorsement, under the section titled, "Name of Person or Organization", as specified below:

- **The District, CM, Architect, Inspector, the State of California, their officers, employees, agents, volunteers and independent contractors as additional insureds.**
- All Contractors must provide an additional insured endorsement for automobile liability.
- Ineligible/Excluded Contractors must provide an additional insured endorsement on both the Automobile Liability and General Liability policies and a waiver of subrogation on workers' compensation.

Antioch Unified School District

c/o Statewide Educational Wrap Up Program (SEWUP)
2355 Crenshaw Blvd., Suite 200
Torrance, CA 90501

5.0 Contractor Responsibilities / Requirements

Throughout the course of the Project, Subcontractors will be responsible for reporting and maintaining certain records as outlined in this section.

All Subcontractors shall cooperate with, and require their tier Subcontractors to cooperate with, the Owner and the Program Administrator, regarding administration and operation of the OCIP. **Each Subcontractor must include this document with their bid specifications to any and all Subcontractors.**

Responsibilities of Subcontractors:

- Enrolling in the OCIP and assuring all eligible tier subcontractors promptly enroll in the OCIP, via WrapPortal, prior to the start of any work
- Complying with the provisions of the OCIP Manual and cooperating in the administration and operation of the OCIP
- Including OCIP Provisions in all subcontracts, as appropriate
- Identifying and removing from bid the cost of OCIP-provided insurance (by all eligible contractors / subcontractors)
- Providing each Subcontractor with a copy of the OCIP manual
- Providing timely evidence of insurance to the SEWUP Department via WrapPortal
- Notifying the SEWUP Department of all awarded subcontracts via WrapPortal
- Maintaining and reporting monthly payroll records (by all eligible subcontractors) via WrapPortal
- Complying with the OCIP Administrator's requests for information
- Complying with insurance, claim and safety procedures
- Notifying OCIP Administrator immediately of any insurance cancellation or non-renewal of Contractor required insurance
- Complying with the OCIP insurance policy requirements, including but not limited to, physical audit of payroll records by the insurance company or its representatives.

5.1 Contractor Bids & Change Orders - Removing Insurance Costs

The Owner / School District provides insurance for all eligible, Enrolled Contractors/Subcontractors for work performed at the project site(s). The Owner pays the insurance premiums for the OCIP coverages described in this manual under section 3.0 OCIP Coverages.

A. Contractor Insurance Cost Identification

Contractor's base bid shall exclude all costs for insurance coverages provided under the OCIP. If insurance cost is not removed, the bidder may not qualify as the lowest responsive bidder. The Bidder declares under penalty of perjury under California law, that the base bid excludes any costs relating to any insurance coverages afforded under the OCIP and that each subcontractor to the Bidder has similarly excluded costs for any insurance coverage afforded under the OCIP.

B. Change Order Pricing

All Contractors/Subcontractors declare, under penalty of perjury under California law, that any change order issued to the contract is priced to exclude any costs relating to any insurance coverage afforded under the OCIP.

5.2 Program Compliance

A. Participation in the OCIP is mandatory but not automatic. An Eligible contractor is not enrolled until the Program Administrator receives and approves the following items:

- Completed Contract Enrollment, for each awarded contract, within ten (10) days of Contract Award and prior to commencement of on-site activities. Enrollments can be completed and submitted electronically visiting www.keenanwrap.com
- Certificates of Insurance, evidencing Insurance for Workers' Compensation & General Liability coverages for off-site locations, labor, and operations
- Certificate of Insurance, including an Additional Insured Endorsement, naming the Owner as an Additional Named Insured, for Automobile Liability for both Project Site and Off-Site operations
- Policy Declarations pages, including proof of rates from your current policies

B. All Contractors/Subcontractors of all tiers shall cooperate with, and require their Subcontractors to cooperate with, the Owner and the Program Administrator in regard to the administration and operation of the OCIP.

C. All Contractors/Subcontractors further acknowledge and agree to comply fully and promptly with such safety, loss control, and quality control rules, requirements, and directives as may from time to time be promulgated by Owner, the Program Administrator and/or the OCIP insurers or any of its or their respective consultants, agents, or representatives. Nothing in this document or any other contract document or in the Project Insurance Manual, shall be deemed to render Owner or any of its affiliates of any tier an employer of Contractor/Subcontractor or any of its Subcontractors or any of its or their personnel or employees. **Failure to comply will be considered non-performance under the contract.**

OCIP Enrollment completed through WrapPortal by the following deadline:

- Subcontractors (All Tiers): Within ten (10) days of Contract Award and prior to commencement of On-site activities

All questions regarding enrollment compliance should be directed to the assigned OCIP Administrator.

Any Subcontractor who enrolls in the OCIP after their start date will have to provide a No-Known-Loss Letter to the Program Administrator, along with enrollment documentation.

For any work under this contract, and until completion and final acceptance of the work by the Owner, the Subcontractors shall, at their own expense, promptly furnish Certificates of Insurance to the Program Administrator before commencing work on the Project Site. Automobile Liability Insurance must be maintained for both Project Site and off-site operations.

5.3 Confirmation of Enrollment & Evidence of OCIP Coverages

Upon review of completed enrollment, OCIP Administrator will acknowledge acceptance of the Eligible Subcontractor into the Owner's OCIP, by issuing the following to each Enrolled Party:

- Confirmation Letter
- OCIP Certificates of Insurance
- Claims Kit, including DWC1 and MPN Notices

These documents, as issued by the OCIP Administrator, will clearly identify the effective dates of the OCIP coverages for the Contract. A separate Workers' Compensation policy will be issued and sent to each Enrolled Party.

Should an Enrolled Party perform work on several contracts/projects, an Enrollment Form must be completed for each contract. The OCIP Administrator will issue confirmation letters and certificates of insurance to each Enrolled Party for each separate contract. However, only one individual Workers' Compensation policy (that will apply to all contracts/projects) will be issued to each Enrolled Party.

Note:

Verify that the Workers' Compensation effective date, listed on your OCIP Certificate of Insurance, reflect the same date as your start date.

5.4 Payroll Reporting Compliance

Project Site Monthly Payroll Report Requirements

- Project Site Monthly Payroll must be submitted to the Program Administrator by the 10th of each month via WrapPortal until the completion of the contract and in no event shall be later than the 15th of each month. Payroll shall be reported only for labor performed at the project jobsite.
- Monthly Payroll Reporting is to begin from the enrollment effective date until the completion of the contract or the policy end date.
- Should no work be performed on the Project Site during a given month, each Enrolled Party is required to submit a form stating that "Non-Performance."
- Payroll reporting must summarize the unburdened payroll by Workers' Compensation Class Code. Certified payroll is not a requirement of the OCIP and cannot be accepted.
- If Monthly Payroll Report is not submitted to Program Administrator on a monthly basis, the Construction Manager and/or Owner can withhold payment until the report is received.

- For those Enrolled Parties performing Work under multiple contracts, for each contract, a Monthly Payroll Report is required each month until contract is finalized.
- All reported project site monthly payroll reported from October through the end of September is submitted by Program Administrator to the OCIP Insurance Carrier for auditing.
- Subcontractor shall keep and maintain accurate and classified records of their payroll for operations at the Project Site.
- A carrier audit may be performed using the reported payroll and other supporting documents. Contractor / Subcontractor agrees to cooperate with the OCIP insurance carrier(s) or their third-party auditors by responding to and providing documents as requested in a timely manner.

Workers' Compensation Insurance Rating Bureau Requirements

- **Payroll Reporting for Each Workers' Compensation Policy Issued** – Once an Eligible Contractor/Subcontractor is enrolled into the OCIP, the Program Administrator will issue a separate Workers' Compensation Policy. All Enrolled Subcontractors will need to comply with the rules and regulations of the California Workers Compensation Insurance Rating Bureau (WCIRB). This requires each Enrolled Party to maintain payroll records for each Contract under the policy issued. Such records will allocate the payroll by Workers' Compensation classification(s) and exclude the excess or premium paid for overtime (i.e., only the straight-time rate will apply to overtime hours worked).
- **Insurance Company Payroll Audit** - Each Enrolled Party must properly classify payrolls, as these are reported to the rating bureau for calculation of future Experience Modifiers for the Enrolled Party's firm. All Enrolled Parties shall make available for inspection and copying their respective company books, vouchers, contracts, documents, and records, of any and all types, for physical inspection by the auditors of the OCIP insurance carrier(s) or Owner's representatives. Availability of records must be for a reasonable time during the policy period, any extension, or during a final audit period, as required by the OCIP Insurance Policies.

5.5 Contract Completion / Closeout Compliance

Contractor's Completion Notice

- Contractor's Completion Notice must be submitted to the Program Administrator via WrapPortal, (www.keenanwrap.com) upon completion of contract work at the Project Site, which includes punch list items, but not warranty or service contract work.
- This form evidences all enrolled Contractors'/Subcontractors' actual start and completion dates, per each contract.
- Completion Notice information is reported to OCIP Insurance carrier to confirm coverage and payroll reporting requirements has ended for the contract.

6.0 Safety

It is the responsibility of each Subcontractor to maintain an environment free of recognized hazards. All Subcontractors shall exercise reasonable care to prevent work-related injuries; property and equipment damage at the Project, as well as minimize risk to the public and third-party property.

In the event of an accident, it shall be the responsibility of the employing and/or responsible Subcontractor to see that injured workers or members of the public are provided immediate

medical treatment. All appropriate medical and claim forms must be filed in accordance with the claim procedures developed for this Project by the Program Administrator. This includes notification to the appropriate state authorities, if necessary.

The Program Administrator shall conduct periodic loss control surveys on behalf of the District. These surveys will focus on evaluating the Subcontractors' efforts to minimize loss, assist in identifying loss exposures, and to recommend appropriate corrective measures. The Program Administrator is a resource to supplement the safety and loss prevention activity of Subcontractors. Its loss control survey activities or other activities of the Program Administrator and/or OCIP insurers do not in any way relieve the Contractors/Subcontractors of their responsibilities for Project safety.

6.1 Occupational Safety and Health Compliance

All Contractors/Subcontractors are expected to comply with all applicable local, state, and federal occupational safety and health. If additional safety and health requirements are set forth in the contract specifications, all contractors shall comply with these requirements

In addition, local, state, and federal occupational safety and health laws, the following standards apply to all OCIP Enrolled and Non-Enrolled Contractors/Subcontractors.

6.2 Safety Orientation

- a. Subcontractor employees shall be provided with a project specific safety orientation prior the start of the project. At a minimum, the orientation will address the following items:
 - i. The District's site safety requirements.
 - ii. Site specific safety hazards and protective measures for these hazards.
 - iii. Emergency telephone numbers and procedures.
 - iv. Local medical clinic/hospital information within the Medical Provider Network (MPN).

6.3 Program Management

- a. Each Subcontractors shall have the following safety programs:
 - i. Injury and Illness Prevention Plans
 - ii. Hazard Communication Programs
 - iii. Heat Illness Prevention Plans
- b. Each Contractor/Subcontractor shall have an onsite competent person responsible for occupational safety and health. **A competent person is one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.**

6.4 Site Safety

According to industry practices, it is the responsibility of contractors of all tiers to exercise reasonable care to prevent work-related injuries; property and equipment damage at the project site, as well as minimize risk to the third-party persons and property. Subcontractors of all tiers shall be expected to comply with the following safety and loss control requirements:

- a. All Subcontractors shall identify their contact person(s) to the General or Prime Contractor.
- b. All Contractors/Subcontractors shall follow District procedures for dealing with the media.

- c. At all times, hard hats shall be worn in the construction environment. Hard hats shall meet the requirements of ANSI Z89.1. No modification to the shell or suspension is allowed except when such changes are approved by the manufacturer.
- d. 100% protective eyewear with side shield protection is required while in the construction environment, shop, or anytime eye hazards exist. Protective eyewear shall bear a legible and permanent “Z87” logo to indicate compliance with applicable ANSI/ASSE Standard.
- e. All construction employees shall wear clothing suitable for the weather and work conditions. At a minimum, this shall be short sleeved shirts, long pants, and leather or other protective work shoes or boots.
- f. Alcohol is prohibited on District property at all times.
- g. Contractors/Subcontractors will be required to respond to all District complaints about objectionable levels of dust or noise and will be required to provide prompt and appropriate abatement.
- h. Construction personnel cannot enter District grounds other than the construction site unless accompanied by District personnel and are allowed only “incidental” contact with students. Violations of these requirements by any construction employee will result in a mandatory background check of that employee – including fingerprinting – as required by state law.
- i. All prime contractors must attend the site-specific pre-construction meeting.
- j. No sexual reference or preference shall be permitted on any piece of clothing or the hardhat. Any employee observed disregarding this policy shall be removed from the job site until further notice.
- k. Contractors and subcontractors at all times shall keep premises free from debris such as waste, rubbish, and excess materials and equipment caused by contract work. Contractors and subcontractors shall not leave debris under, in, or about the premises. Upon completion of the contract work, contractors and subcontractors shall clean the interior and exterior of the building or improvement including fixtures, equipment, walls, floors, ceilings, roofs, windowsills and ledges, horizontal projections, and any areas where debris has collected so surfaces are free from foreign material or discoloration. Contractors and subcontractors 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 the site. No glass containers are permitted on the site.
- l. Theft or willful damage to any property of the District, student, or other contractors will be prosecuted fully.
- m. All Contractors/Subcontractors will advise non-English speaking employees in their native language either in a written format or via an interpreter of these policies.

6.5 Mandatory 6 Foot Fall Protection

- a. Contractor/Subcontractor employees shall be protected from fall exposures of 6 feet or greater. Activities include but are not limited to:
 - i. Steel erection
 - ii. Decking
 - iii. Roofing
 - iv. Framing

- v. Work performed from scaffolds
- vi. Work performed from ladders

Exceptions: The following exceptions apply only to framers and wood frame activities

- i. When installing or “rolling” the joists, Cal/OSHA fall protection requirements shall govern.
 - ii. When framers are walking/working on securely braced joists, rafters, or roof trusses on center spacing not exceeding 24 inches, and more than 6’ from an unprotected side or edge, they shall be considered protected from falls between the joists, rafters, or roof trusses
- b. A safety monitor as means of fall protection is prohibited.
 - c. Ladder jacks, lean-to, and prop-scaffolds are prohibited.
 - d. Contractor/Subcontractors are required to provide training to their employees who might be exposed to a fall hazard prior to the exposure or upon hiring. This training shall be documented and available for review.
 - e. Methods of fall protection include but are not limited to the following:
 - i. Railings
 - ii. Covers for Floor, Roof, and Wall Openings
 - iii. Personal Fall Arrest Systems, Personal Fall Restraint Systems, and Positioning Devices
 - iv. Controlled Access Zones
 - f. The design and construction of railings shall conform to the Cal/OSHA Construction Safety Orders.
 - g. The use of wire ropes as top rails and intermediate rails of guardrail systems used for perimeter protection, or at interior openings such as stairways and elevator shafts, shall be installed in accordance with Cal/OSHA requirements. Additionally, wire ropes shall be secured to each support and taut at all times. The maximum deflection of the top rail when a load of 200 pounds is applied in any direction at any point of the top rail shall not exceed 3 inches in one direction which includes the free hanging sag in the wire rope.
 - h. The minimum parapet height allowed for fall protection is 42 inches or greater.
 - i. Covers used to cover floor, roof, and wall openings shall be secured in place to prevent accidental removal or displacement and shall be marked in accordance with Cal/OSHA Construction Safety Orders.
 - j. Covers used to cover floor and roof openings shall be capable of safely supporting the greater of 400 pounds or twice the weight of the employees, equipment and materials that may be imposed on any one square foot area of the cover at any time.
 - k. Controlled access zones shall be defined by a control line or other means that restricts access. Each line shall have a minimum breaking strength of 200 pounds. Signs shall be posted to warn unauthorized employees to stay out of the controlled access zone.
 - l. Control lines shall consist of ropes, wires, tapes, or equivalent materials. Control lines shall be erected and supported in accordance with Cal/OSHA Construction Safety Orders.
 - m. Scaffold Access/Egress. An internal ladder system with hatches and drop-down ladders or temporary stairs shall be provided for safe access/egress on all scaffolds 20 feet or

- greater in height. External straight ladders are prohibited on all scaffolds if it exposes a user to a fall of 20 feet or greater in height.
- n. When adjustable scaffolds are utilized, they shall have rest platforms at 20-foot maximum vertical intervals.

6.6 Crane Safety

- a. In accordance with Title 8, California Code of Regulations, section 5006.1, employers shall only permit operators who have a valid certificate (license) of competency to operate cranes. The operator shall have his license on his person, readily available for review.
- b. All cranes used in lifting service, exceeding 3 tons rated capacity, and their accessory gear shall not be used until the employer has ascertained that such equipment has been certificated in accordance with Cal/OSHA as evidenced by current and valid documents. Certificates (annual and quadrennial) attesting to current compliance with testing and examination standards shall be maintained, readily available for each crane.
- c. The contractor shall provide an erection plan and procedure for erection of trusses and beams over 25 feet long. The erection plan and procedure shall be prepared by a civil engineer currently registered in California. This plan and procedure shall be followed and kept available on the job site.

6.7 Fire Prevention During Welding, Cutting, and Other Hot Work

- a. Contractors engaged in welding and allied processes, heat treating, grinding, cutting, thawing pipe, powder-driven fasteners, hot riveting, torch-applied roofing in conjunction with the requirements of NFPA 241, and similar applications producing or using a spark, flame, or heat shall adhere to National Fire Protection Association Standard 51B entitled "Standard for Fire Prevention During Welding, Cutting, and Other Hot Work."

6.8 Incident Investigation Requirements

- a. The contractor shall perform thorough, in-depth investigations and evaluations of all incidents. A formal incident investigation shall be conducted whenever any incident occurs, including, without limitation, both non-injury incidents and incidents involving first aid. Additionally, near miss accidents and/or incidents must be reported and undergo the same in-depth investigation, root cause analysis and lessons learned process. The incident investigation report shall be e-mailed to Keenan and Associates within 5 working days.
- b. Recommendations and lessons learned to prevent recurrence of incidents shall be documented and communicated to all employees of contractor and subcontractors through safety meetings

6.9 Return to Work

The District and OCIP Carrier are committed to working with all Enrolled Contractors and Subcontractors to promote the successful & timely return to work of injured employees following a work-related injury. The purpose of this policy is to ensure that Enrolled Contractor/Subcontractor employees who temporarily cannot return to their normal duties due to job-related injury or illness but can safely perform transitional duties while recovering is offered appropriate transitional duties for a limited time only.

- a. An employee who has experienced a job-related injury requiring medical treatment must provide a proper medical release prior to returning to work.

- b. An employee who has been removed from the jobsite ambulatory must provide a proper medical release prior to returning to work.
- c. Each Enrolled Contractor/Subcontractor will cooperate with the OCIP Carrier to facilitate the return to work of any injured employee capable of safely performing transitional duties.
- d. When the employee is released to transitional duties, it is the Enrolled Contractor/Subcontractor's responsibility to facilitate the injured employee's return to work.
- e. The Enrolled Contractor/Subcontractor is fully expected to accommodate the injured employee and facilitate the return to work.
- f. It will be the responsibility of the Insurance Carrier to maintain communication with the treating physician and the Enrolled Contractor/Subcontractor to facilitate the prompt return of an employee to full work status.

6.10 Conflicting Safety Requirements:

Contractors and subcontractors shall adhere to all applicable federal, state, local, and contractual safety and health requirements. If there is a conflict between any of these safety and health requirements, the most stringent requirement shall apply.

6.11 Noncompliance and Unsafe Practices

Owner or their representative shall have the authority to immediately cease any and all operation (s) on the jobsite that is deemed by Owner or their representative to be unsafe to property or has the potential to cause Bodily Injury, pursuant to Title VIII California Code of Regulation, Section 1511. Any such cession of work shall not constitute recoverable delay or other contractual remedies for liquidated damages and may expose the offending contractor to any such losses to the District or other trades.

6.12 Professional Conduct Clause

Contractors and subcontractors shall at all times adhere to safety requirements (contractual and regulatory) and shall encourage safe and professional behavior among their employees. Contractor and subcontractors shall not allow on the job site any unfit person, unsafe person, anyone unskilled and unqualified to perform the work assigned to them, or anyone exhibiting such qualities. Any person in the employ of the contractor or subcontractor whom the District or the District's agent/representative may deem incompetent, unsafe, or unfit shall be immediately dismissed from the OCIP job site and shall not again be allowed on the OCIP the job site except with the written consent of District or the District's agent/representative. The District reserves the right to request that the contractor or subcontractor's assigned Project Supervisor/Manager be replaced immediately.

7.0 Claims Reporting

Accident/Claims Reporting Procedures - Overview

This section describes the basic procedures for reporting SEWUP claims: Workers' Compensation, General Liability, Pollution Liability, and Damage to the Project (Builder's Risk).

The OCIP Administrator provides an Accident Claims Reporting Guide to Enrolled Contractors and Subcontractors. The Accident Claims Reporting Guide provides instructions and

necessary information for reporting a claim, including policy numbers and site location codes. **This manual includes the required claim forms and postings.** Additional claim forms can be obtained from the OCIP Administrator upon request.

7.1 Workers' Compensation Claim Reporting & Procedures

If the injury requires a doctor (or medical office) visit or involves lost time, please follow the procedures listed below.

Contractors'/Subcontractors' on-site personnel must follow these procedures if any employee is involved in an accident or occurrence resulting in bodily injury or death:

The main responsibility for any Contractor and Subcontractor is first to see that the injured worker receives immediate medical care. Immediately contact 911 for any serious, traumatic, and life-threatening injuries.

If an employee reports a work injury or illness that is minor and does not require a doctor visit or time off from work, the supervisor should refer the employee to the nearest **First Aid Treatment** available at the jobsite.

Call Liberty Mutual Insurance Company at **1-800-362-0000** or email them at CLclaimsreports@libertymutual.com to report the injury. Access the Workers' Compensation Claim Kit, sent to you by the Program Administrator, which contains forms to be completed by employee and employer, as well as accident reporting guidelines. Have the following items ready when reporting the claim:

- **SEWUP Workers' Compensation Policy Number (Provided at time of enrollment)**
- **SEWUP Site Location Code**

Medical Provider Network (MPN)

Liberty Mutual Insurance, the Statewide Educational Wrap Up Program's insurance carrier, has implemented the following Medical Provider Network (MPN):

Liberty Mutual Insurance MPN

The above MPN is to be utilized for the medical treatment of injured employees, unless the employee has pre-designated their medical provider prior to the date of loss. In emergency situations, it is always recommended that the injured worker be treated at an emergency medical facility first, and then sent to a physician in the Medical Provider Network (MPN).

MPN Regulations & Guidelines:

- California MPN rules and regulations require that the injured worker must receive the Full Written MPN Notification when an injury is reported, or at the time of injury. The English version is given to English speaking employees and the Spanish version is given to Spanish speaking employees. The Full Written MPN Notification must also be given to the injured worker when changing to and transferring open claims to the Gallagher Bassett Platinum MPN.
- The MPN regulations are silent about Employee Acknowledgement Letters. As an employer, you have the right to use acknowledgement letters for your employees to sign when you give your employee the Full Written MPN Notification.
- An MPN Panel Card shall be posted at SEWUP Project Jobsite, Displaying the Name, Address and a Map of Designated Medical Clinic close to the jobsite.

- **For locating participating medical providers** within the Liberty Mutual Insurance MPN, use your Internet Browser to access the below website, which will provide links for locating a medical provider within the network by specialty and by location,

<https://lmi.co/LMnetworks>

State Required Workers' Compensation Forms

The Labor Code requires that an employee report any injury immediately to the employer. There are essential requirements for both the employer and employee to after the injury has been reported.

The Labor Code provides for possible penalties to be assessed if the following timelines are not met:

- Provision of the Employee Claim Form, DWC-1; report within one (1) working day of the employer's knowledge of a disability or injury beyond first aid. Each employer is responsible for providing this form to an injured employee. Should the employee not be available for hand delivery, mail the DWC-1 to the employee at their home address.
- Provision of the Employer's Report of Injury, Form 5020; report, within five (5) days of knowledge, every occupational injury or illness which results in lost time beyond the date of the incident or requires medical treatment at a medical facility. In addition, every serious illness/injury or death must be reported immediately by telephone or fax to the nearest office of the California Division of Occupational Safety and Health.

7.2 General Liability Claim Reporting

Contractors/Subcontractor must immediately report all known or suspected First Party, Third Party or Pollution Liability incidents occurring at the Project Site involving bodily injury, death, or any damage to property to the following:

- Keenan & Associates - **1-310-212-0363 x.2116**. Have the following information ready when reporting claim
 - SEWUP General Liability Policy Number
 - SEWUP Site Location Code
- Program Administrator (SEWUP) – Email: TMyer@Keenan.com & SEWUP@keenand.com, Phone: (800) 654-8102. Notice of Occurrence - Accident/Incident Report may be email or faxed.

Note:

Always take appropriate emergency measures to prevent additional injury or damage, including contacting police and fire authorities as required by law.

7.3 Builder's Risk Claim Reporting

Contractors/Subcontractors must immediately report all property damage to your work or work of any other Contractor/Subcontractor at the Project Site, to the following:

- Keenan & Associates - **1-310-212-0363 x.2116**
- Ace USA Property Claims – Email: Propertyfirstnotices@acegroup.com, Phone: (800) 433-0385
- Program Administrator (SEWUP) – Email: TMyer@Keenan.com & SEWUP@keenand.com, Phone: (800) 654-8102.

Note:

Always take appropriate emergency measures to prevent additional injury or damage, including contacting police and fire authorities as required by law.

7.4 Contractor's Pollution Liability Claim Reporting

Contractors/Subcontractors must immediately report all third-party accidents related to a known or suspected pollution incident at the Project Site involving bodily injury, death, or any damage to property to the following:

- Keenan & Associates - **1-310-212-0363 x.2116**
- Berkley Assurance Company - Electronic Reporting - **BCPclaims@BerkleyCP.com**
- Program Administrator (SEWUP) – Email: TMyer@Keenan.com & SEWUP@keenand.com, Phone: (800) 654-8102.

7.5 Automobile Claim Reporting

NO coverage is provided for automobile use by Contractors/Subcontractors under the OCIP. It is the sole responsibility of each Contractor and Subcontractor to report claims involving their automobiles to their own insurance carrier.

7.6 Instructions and Procedures – Litigation Papers, Legal Documents, etc.

If your firm is served with a lawsuit arising out of your involvement with the Owner's Project, or if receipt of litigation papers or legal documents is your first notice of a claim, forward to the following:

- Program Administrator (SEWUP) – Email: SEWUP@keenand.com, Phone: (800) 654-8102

7.7 Investigation Assistance/Confirmation of Claim Receipt

All Contractors/Subcontractors will assist in the investigation of any accident or occurrence involving injury to persons or property. All Contractors/Subcontractors must cooperate with the companies involved in adjusting any claim by securing and giving evidence and obtaining the participation and attendance of witnesses required for the investigation and defense of any claim or suit.

Upon receipt of the claim or incident from the Contractor, the respective OCIP insurance carrier will send a claims acknowledgment letter with the assigned claims file number. Always cooperate with the Owner or the OCIP insurer representatives in the accident investigation.

8.0 Required Project Forms

- **8.1 First Report of Injury (5020)**
- **8.2 Workers' Compensation Claim Form (DWC-1)**
- **8.3 Notice of Occurrence - Accident/Incident Report – General Liability, Pollution, Builders Risk**

8.1 First Report of Injury (5020)

District Name: _____

Project Name: _____

| | | | | | |
|--|--|--|--|---|--|
| State of California EMPLOYER'S REPORT OF OCCUPATIONAL INJURY OR ILLNESS | | PLEASE COMPLETE (TYPE, IF POSSIBLE). MAIL TWO COPIES TO: | | OSHA CASE NO. <input type="checkbox"/> FATALITY | |
| Any person who makes or causes to be made any knowingly false or fraudulent material statement or material representation for the purpose of obtaining or denying workers compensation benefits or payments of guilty of a felony. | | NOTICE: California law requires employers to report within five days of knowledge every occupational injury or illness which results in lost time beyond the date of the incident OR requires medical treatment beyond first aid. If an employee subsequently dies as a result of a previously reported injury or illness, the employer must file within five days of knowledge an amended report indicating death. In addition, every serious illness/injury or death must be reported immediately by telephone or telegraph to the nearest office of the California Division of Occupational Safety and Health | | | |
| E M P L O Y E R | 1. FIRM NAME | | 1A. POLICY NUMBER | | DO NOT USE THIS COLUMN |
| | 2. MAILING ADDRESS (Number and Street, City, ZIP) | | 2A. PHONE NUMBER | | Case No. |
| | 3. LOCATION, IF DIFFERENT FROM MAILING ADDRESS (Number and Street, City, ZIP) | | 3A. LOCATION CODE | | Ownership |
| | 4. NATURE OF BUSINESS, e.g., painting contractor, wholesale grocer, sawmill, hotel, etc. | | 5. STATE UNEMPLOYMENT INSURANCE ACCT NUMBER | | Industry |
| | 6. TYPE OF EMPLOYER <input type="checkbox"/> PRIVATE <input type="checkbox"/> STATE <input type="checkbox"/> CITY <input type="checkbox"/> COUNTY <input type="checkbox"/> SCHOOL DIST. <input type="checkbox"/> OTHER GOV. - SPECIFY _____ | | | | Occupation |
| E M P L O Y E E | 7. EMPLOYEE NAME | | 8. SOCIAL SECURITY NUMBER | 9. DATE OF BIRTH (mm dd yy) | |
| | 10. HOME ADDRESS (Number and Street, City, ZIP) | | 10A. PHONE NUMBER | | Age |
| | 11. SEX <input type="checkbox"/> MALE <input type="checkbox"/> FEMALE | 12. OCCUPATION (Regular job title - NO initials, abbreviations or numbers) | | 13. DATE OF HIRE (mm dd yy) | |
| | 14. EMPLOYEE USUALLY WORKS _____ hours per day _____ days per week _____ total wkly. hrs | | 14A. EMPLOYMENT STATUS (check applicable status at time of injury) regular full-time part-time temp. seasonal | | 14B. Under what class code of your policy were wages assigned |
| | 15. GROSS WAGES/SALARY \$ _____ PER _____ | | 16. OTHER PAYMENTS NOT REPORTED AS WAGES/Salary (e.g., tips, meals, lodging, overtime, bonuses, etc.)? <input type="checkbox"/> YES \$ _____ PER _____ <input type="checkbox"/> NO | | Weekly Hours |
| I N J U R Y O R I L L N E S S | 17. DATE OF INJURY OR ONSET OF ILLNESS (mm dd yy) | | 18. TIME INJURY ILLNESS OCCURRED A.M. P.M. | | 19. TIME EMPLOYEE BEGAN WORK A.M. P.M. |
| | 20. IF EMPLOYEE DIED, DATE OF DEATH (mm dd yy) | | | | Weekly Wage |
| | 21. UNABLE TO WORK FOR AT LEAST ONE FULL DAY AFTER DATE OF INJURY <input type="checkbox"/> YES <input type="checkbox"/> NO | | 22. DATE LAST WORKED (mm dd yy) | | 23. DATE RETRUNED TO WORK (mm dd yy) |
| | 24. IF STILL OFF WORK CHECK THIS BOX <input type="checkbox"/> | | | | County |
| | 25. PAID FULL WAGES FOR DAY OF INJURY OR LAST DAY WORKED <input type="checkbox"/> YES <input type="checkbox"/> NO | | 26. SALARY BEING CONT'D? <input type="checkbox"/> YES <input type="checkbox"/> NO | | 27. DATE OF EMPLOYER'S KNOWLEDGE NOTICE OF INJURY/ILLNESS (mm dd yy) |
| | 28. DATE EMPLOYEE WAS PROVIDED EMPLOYEE CLAIM FORM (mm dd yy) | | | | Nature of Injury |
| | 29. SPECIFIC INJURY/ILLNESS AND PART OF BODY AFFECTED, MEDICAL DIAGNOSIS, if available, e.g., second degree burns on right arm, tendonitis of left elbow, lead poisoning | | | | Part of Body |
| | 30. LOCATION WHERE EVENT OR EXPOSURE OCCURRED (Number and Street, City) | | 30A. COUNTY | 30B. ON EMPLOYER'S PREMISES <input type="checkbox"/> YES <input type="checkbox"/> NO | |
| | 31. DEPARTMENT WHERE EVENT OR EXPOSURE OCCURRED, e.g. shipping department, machine shop. | | 32. OTHER WORKERS INJURED/ILL IN THIS EVENT? <input type="checkbox"/> YES <input type="checkbox"/> NO | | Event |
| | 33. EQUIPMENT, MATERIALS AND CHEMICALS THE EMPLOYEE WAS USING WHEN EVENT OR EXPOSURE OCCURRED, e.g., acetylene, welding torch, farm tractor, scaffold | | | | Sec. Source |
| 34. SPECIFIC ACTIVITY THE EMPLOYEE WAS PERFORMING WHEN EVENT OR EXPOSURE OCCURRED, e.g., welding seams of metal forms, loading boxes into truck | | | | Extent of Injury | |
| 35. HOW INJURY/ILLNESS OCCURRED. DESCRIBE SEQUENCE OF EVENTS SPECIFY OBJECT OR EXPOSURE WHICH DIRECTLY PRODUCED THE INJURY/ILLNESS (e.g., worker stepped back to inspect work and slipped on scrap material. As he fell, he brushed against fresh weld and burned right hand). USE SEPARATE SHEET IF NECESSARY | | | | | |
| 36. NAME AND ADDRESS OF PHYSICIAN (Number and Street, City, ZIP) | | | | 36A. PHONE NUMBER | |
| 37. IF HOSPITALIZED AS AN INPATIENT, NAME AND ADDRESS OF HOSPITAL (Number and Street, City, ZIP) | | | | 37A. PHONE NUMBER | |
| COMPLETED BY (type or print) | | SIGNATURE | | TITLE | DATE |

8.2 Workers' Compensation Claim Form (DWC-1)

Formulario de Reclamo de Compensación para Trabajadores (DWC 1) y Notificación de Posible Elegibilidad

If you are injured or become ill, either physically or mentally, because of your job, including injuries resulting from a workplace crime, you may be entitled to workers' compensation benefits. Attached is the form for filing a workers' compensation claim with your employer. **You should read all of the information below.** Keep this sheet and all other papers for your records. You may be eligible for some or all of the benefits listed depending on the nature of your claim. If required you will be notified by the claims administrator, who is responsible for handling your claim, about your eligibility for benefits.

To file a claim, complete the "Employee" section of the form, keep one copy and give the rest to your employer. Your employer will then complete the "Employer" section, give you a dated copy, keep one copy and send one to the claims administrator. Benefits can't start until the claims administrator knows of the injury, so complete the form as soon as possible.

Medical Care: Your claims administrator will pay all reasonable and necessary medical care for your work injury or illness. Medical benefits may include treatment by a doctor, hospital services, physical therapy, lab tests, x-rays, and medicines. Your claims administrator will pay the costs directly so you should never see a bill. For injuries occurring on or after 1/1/04, there is a limit on some medical services.

The Primary Treating Physician (PTP) is the doctor with the overall responsibility for treatment of your injury or illness. Generally your employer selects the PTP you will see for the first 30 days, however, in specified conditions, you may be treated by your predesignated doctor. If a doctor says you still need treatment after 30 days, you may be able to switch to the doctor of your choice. Special rules apply if your employer offers a Health Care Organization (HCO) or after 1/1/05, has a medical provider network. Contact your employer for more information. If your employer has not put up a poster describing your rights to workers' compensation, you may choose your own doctor immediately.

Within one working day after an employee files a claim form, the employer shall authorize the provision of all treatment, consistent with the applicable treating guidelines, for the alleged injury and shall continue to provide treatment until the date that liability for the claim is accepted or rejected. Until the date the claim is accepted or rejected, liability for medical treatment shall be limited to ten thousand dollars (\$10,000).

Disclosure of Medical Records: After you make a claim for workers' compensation benefits, your medical records will not have the same privacy that you usually expect. If you don't agree to voluntarily release medical records, a workers' compensation judge may decide what records will be released. If you request privacy, the judge may "seal" (keep private) certain medical records.

Payment for Temporary Disability (Lost Wages): If you can't work while you are recovering from a job injury or illness, you will receive temporary disability payments. These payments may change or stop when your doctor says you are able to return to work. These benefits are tax-free. Temporary disability payments are two-thirds of your average weekly pay, within minimums and maximums set by state law. Payments are not made for the first three days you are off the job unless you are hospitalized overnight or cannot work for more than 14 days.

Si Ud. se lesiona o se enferma, ya sea física o mentalmente, debido a su trabajo, incluyendo lesiones que resulten de un crimen en el lugar de trabajo, es posible que Ud. tenga derecho a beneficios de compensación para trabajadores. Se adjunta el formulario para presentar un reclamo de compensación para trabajadores con su empleador. **Ud. debe leer toda la información a continuación.** Guarde esta hoja y todos los demás documentos para sus archivos. Es posible que usted reúna los requisitos para todos los beneficios, o parte de éstos, que se enumeran, dependiendo de la índole de su reclamo. Si se requiere, el/la administrador(a) de reclamos, quien es responsable del manejo de su reclamo, le notificará a usted, lo referente a su elegibilidad para beneficios.

Para presentar un reclamo, complete la sección del formulario designada para el "Empleado", guarde una copia, y déle el resto a su empleador. Entonces, su empleador completará la sección designada para el "Empleador", le dará a Ud. una copia fechada, guardará una copia, y enviará una al/la administrador(a) de reclamos. Los beneficios no pueden comenzar hasta, que el/la administrador(a) de reclamos se entere de la lesión, así que complete el formulario lo antes posible.

Atención Médica: Su administrador(a) de reclamos pagará toda la atención médica razonable y necesaria, para su lesión o enfermedad relacionada con el trabajo. Es posible que los beneficios médicos incluyan el tratamiento por parte de un médico, los servicios de hospital, la terapia física, los análisis de laboratorio y las medicinas. Su administrador(a) de reclamos pagará directamente los costos, de manera que usted nunca verá un cobro. Para lesiones que ocurren en o después de 1/1/04, hay un límite de visitas para ciertos servicios médicos.

El Médico Primario que le Atiende-Primary Treating Physician **PTP** es el médico con toda la responsabilidad para dar el tratamiento para su lesión o enfermedad. Generalmente, su empleador selecciona al PTP que Ud. Verá durante los primeros 30 días. Sin embargo, en condiciones específicas, es posible que usted pueda ser tratado por su médico pre-designado. Si el doctor dice que usted aún necesita tratamiento después de 30 días, es posible que Ud. pueda cambiar al médico de su preferencia. Hay reglas especiales que son aplicables cuando su empleador ofrece una Organización del Cuidado Médico (HCO) o después de 1/1/05 tiene un Sistema de Proveedores de Atención Médica. Hable con su empleador para más información. Si su empleador no ha colocado un poster describiendo sus derechos para la compensación para trabajadores, Ud. puede seleccionar a su propio medico inmediatamente.

El empleador autorizará todo tratamiento médico consistente con las directivas de tratamiento aplicables a la lesión o enfermedad, durante el primer día laboral después que el empleado efectúa un reclamo para beneficios de compensación, y continuará proveyendo este tratamiento hasta la fecha en que el reclamo sea aceptado o rechazado. Hasta la fecha en que el reclamo sea aceptado o rechazado, el tratamiento médico será limitado a diez mil dólares (\$10,000).

Divulgación de Expedientes Médicos: Después de que Ud. presente un reclamo para beneficios de compensación para los trabajadores, sus expedientes médicos no tendrán la misma privacidad que usted normalmente espera. Si Ud. no está de acuerdo en divulgar voluntariamente los expedientes médicos, un(a) juez de compensación para trabajadores posiblemente decida qué expedientes se revelarán. Si Ud. Solicita privacidad, es posible que el/la juez "selle" (mantenga privados) ciertos expedientes médicos.

Pago por Incapacidad Temporal (Sueldos Perdidos): Si Ud. no puede trabajar, mientras se está recuperando de una lesión o enfermedad relacionada con el trabajo, Ud. recibirá pagos por incapacidad temporal. Es posible que estos pagos cambien o paren, cuando su médico diga que Ud. está en condiciones de regresar a trabajar. Estos beneficios son libres de impuestos. Los pagos por incapacidad temporal son dos tercios de su pago semanal promedio, con cantidades mínimas y máximas establecidas por las leyes estatales. Los pagos no se hacen durante los primeros tres



Return to Work: *To help you to return to work as soon as possible, you should actively communicate with your treating doctor, claims administrator, and employer about the kinds of work you can do while recovering. They may coordinate efforts to return you to modified duty or other work that is medically appropriate. This modified or other duty may be temporary or may be extended depending on the nature of your injury or illness.*

Payment for Permanent Disability: If a doctor says your injury or illness results in a permanent disability, you may receive additional payments. The amount will depend on the type of injury, your age, occupation, and date of injury.

Vocational Rehabilitation (VR): If a doctor says your injury or illness prevents you from returning to the same type of job and your employer doesn't offer modified or alternative work, you may qualify for VR. If you qualify, your claims administrator will pay the costs, up to a maximum set by state law. VR is a benefit for injuries that occurred prior to 2004.

Supplemental Job Displacement Benefit (SJDB): If you do not return to work within 60 days after your temporary disability ends, and your employer does not offer modified or alternative work, you may qualify for a nontransferable voucher payable to a school for retraining and/or skill enhancement. If you qualify, the claims administrator will pay the costs up to the maximum set by state law based on your percentage of permanent disability. SJDB is a benefit for injuries occurring on or after 1/1/04.

Death Benefits: If the injury or illness causes death, payments may be made to relatives or household members who were financially dependent on the deceased worker.

It is illegal for your employer to punish or fire you for having a job injury or illness, for filing a claim, or testifying in another person's workers' compensation case (Labor Code 132a). If proven, you may receive lost wages, job reinstatement, increased benefits, and costs and expenses up to limits set by the state.

You have the right to disagree with decisions affecting your claim. If you have a disagreement, contact your claims administrator first to see if you can resolve it. If you are not receiving benefits, you may be able to get State Disability Insurance (SDI) benefits. Call State Employment Development Department at (800) 480-3287.

You can obtain free information from an information and assistance officer of the State Division of Workers' Compensation, or you can hear recorded information and a list of local offices by calling **(800) 736-7401**. You may also go to the DWC web site at **www.dir.ca.gov**. Link to Workers' Compensation.

You can consult with an attorney. Most attorneys offer one free consultation. If you decide to hire an attorney, his or her fee will be taken out of some of your benefits. For names of workers' compensation attorneys, call the State Bar of California at (415) 538-2120 or go to their web site at **www.californiaspecialist.org**.

is en que Ud. no trabaje, a menos que Ud. sea hospitalizado(a) de che, o no pueda trabajar durante más de 14 días.

Regreso al Trabajo: Para ayudarle a regresar a trabajar lo antes posible, Ud. debe comunicarse de manera activa con el médico que le atiende, el/la administrador(a) de reclamos y el empleador, con respecto a las clases de trabajo que Ud. puede hacer mientras se recupera. Es posible que ellos coordinen esfuerzos para regresarle a un trabajo modificado, o a otro trabajo, que sea apropiado desde el punto de vista médico. Este trabajo modificado, u otro trabajo, podría extenderse o no temporalmente, dependiendo de la índole de su lesión o enfermedad.

Pago por Incapacidad Permanente: Si el doctor dice que su lesión o enfermedad resulta en una incapacidad permanente, es posible que Ud. reciba pagos adicionales. La cantidad dependerá de la clase de lesión, su edad, su ocupación y la fecha de la lesión.

Rehabilitación Vocacional: Si el doctor dice que su lesión o enfermedad no le permite regresar a la misma clase de trabajo, y su empleador no le ofrece trabajo modificado o alternativo, es posible que usted reúna los requisitos para rehabilitación vocacional. Si Ud. reúne los requisitos, su administrador(a) de reclamos pagará los costos, hasta un máximo establecido por las leyes estatales. Este es un beneficio para lesiones que ocurrieron antes de 2004.

Beneficio Suplementario por Desplazamiento de Trabajo: Si Ud. No vuelve al trabajo en un plazo de 60 días después que los pagos por incapacidad temporal terminan, y su empleador no ofrece un trabajo modificado o alternativo, es posible que usted reúna los requisitos para recibir un vale no-transferible pagadero a una escuela para recibir un Nuevo entrenamiento y/o mejorar su habilidad. Si Ud. reúne los requisitos, el administrador(a) de reclamos pagará los costos hasta un máximo establecido por las leyes estatales basado en su porcentaje del incapacidad permanente. Este es un beneficio para lesiones que ocurren en o después de 1/1/04.

Beneficios por Muerte: Si la lesión o enfermedad causa la muerte, es posible que los pagos se hagan a los parientes o a las personas que vivan en el hogar, que dependían económicamente del/de la trabajador(a) difunto(a).

Es ilegal que su empleador le castigue o despidan, por sufrir una lesión o enfermedad en el trabajo, por presentar un reclamo o por atestiguar en el caso de compensación para trabajadores de otra persona. (El Código Laboral sección 132a). Si es probado, puede ser que usted reciba pagos por pérdida de sueldos, reposición del trabajo, aumento de beneficios, y gastos hasta un límite establecido por el estado. Ud. tiene derecho a estar en desacuerdo con las decisiones que afecten su reclamo. Si Ud. tiene un desacuerdo, primero comuníquese con su administrador(a) de reclamos, para ver si usted puede resolverlo. Si usted no está recibiendo beneficios, es posible que Ud. pueda obtener beneficios de Seguro Estatal de Incapacidad (SDI). Llame al Departamento Estatal del Desarrollo del Empleo (EDD) al (800) 480-3287.

Ud. puede obtener información gratis, de un oficial de información y asistencia, de la División estatal de Compensación al Trabajador (*Division of Workers' Compensation – DWC*), o puede escuchar información grabada, así como una lista de oficinas locales, llamando al **(800) 736-7401**. Ud. también puede ir al sitio electrónico en el Internet de la DWC en **www.dir.ca.gov**. Enlázese a la sección de Compensación para Trabajadores.

Ud. puede consultar con un(a) abogado(a). La mayoría de los abogados ofrecen una consulta gratis. Si Ud. decide contratar a un(a) abogado(a), sus honorarios se tomarán de sus beneficios. Para obtener nombres de abogados de compensación para trabajadores, llame a la Asociación Estatal de Abogados de California (*State Bar*) al (415) 538-2120, ó vaya a su sitio electrónico en el Internet en **www.californiaspecialist.org**.

DIVISION OF WORKERS' COMPENSATION

WORKERS COMPENSATION CLAIM FORM (DWC 1)

Employee: Complete the "Employee" section and give the form to your employer. Keep a copy and mark it "Employee's Temporary Receipt" until you receive the signed and dated copy from your employer. You may call the Division of Workers' Compensation and hear recorded information at **(800) 736-7401**. An explanation of workers' compensation benefits is included as the cover sheet of this form.

You should also have received a pamphlet from your employer describing workers' compensation benefits and the procedures to obtain them.

Any person who makes or causes to be made any knowingly false or fraudulent material statement or material representation for the purpose of obtaining or denying workers' compensation benefits or payments is guilty of a felony.

Estado de California

Departamento de Relaciones Industriales

DIVISION DE COMPENSACIÓN AL TRABAJADOR

**PETITION DEL EMPLEADO PARA DE
COMPENSACIÓN DEL TRABAJADOR (DWC 1)**

Empleado: Complete la sección "Empleado" y entregue la forma a su empleador. Quédese con la copia designada "Recibo Temporal del Empleado" hasta que Ud. reciba la copia firmada y fechada de su empleador. Ud. puede llamar a la División de Compensación al Trabajador al **(800) 736-7401** para oír información grabada. En la hoja cubierta de esta forma esta la explicación de los beneficios de compensación al trabajador.

Ud. también debería haber recibido de su empleador un folleto describiendo los beneficios de compensación al trabajador lesionado y los procedimientos para obtenerlos.

Toda aquella persona que a propósito haga o cause que se produzca cualquier declaración o representación material falsa o fraudulenta con el fin de obtener o negar beneficios o pagos de compensación a trabajadores lesionados es culpable de un crimen mayor "felonia".

Employee—complete this section and see note above. Empleado—complete esta sección y note la notación arriba.

1. Name. *Nombre.* _____ Today's Date. *Fecha de Hoy.* _____
2. Home Address. *Dirección Residencial.* _____
3. City. *Ciudad.* _____ State. *Estado.* _____ Zip. *Código Postal.* _____
4. Date of Injury. *Fecha de la lesión (accidente).* _____ Time of Injury. *Hora en que ocurrió.* _____ a.m. _____ p.m.
5. Address and description of where injury happened. *Dirección/ lugar dónde ocurrió el accidente.* _____
6. Describe injury and part of body affected. *Describe la lesión y parte del cuerpo afectada.* _____
7. Social Security Number. *Número de Seguro Social del Empleado.* _____
8. Signature of employee. *Firma del empleado.* _____

Employer—complete this section and see note below. Empleador—complete esta sección y note la notación abajo.

9. Name of employer. *Nombre del empleador.* _____
10. Address. *Dirección.* _____
11. Date employer first knew of injury. *Fecha en que el empleador supo por primera vez de la lesión o accidente.* _____
12. Date claim form was provided to employee. *Fecha en que se le entregó al empleado la petición.* _____
13. Date employer received claim form. *Fecha en que el empleado devolvió la petición al empleador.* _____
14. Name and address of insurance carrier or adjusting agency. *Nombre y dirección de la compañía de seguros o agencia administradora de seguros.* _____
15. Insurance Policy Number. *El número de la póliza de Seguro.* _____
16. Signature of employer representative. *Firma del representante del empleador.* _____
17. Title. *Título.* _____ 18. Telephone. *Teléfono.* _____

Employer: You are required to date this form and provide copies to your insurer or claims administrator and to the employee, dependent or representative who filed the claim within **one working day** of receipt of the form from the employee.

SIGNING THIS FORM IS NOT AN ADMISSION OF LIABILITY

Empleador: Se requiere que Ud. feche esta forma y que provea copias a su compañía de seguros, administrador de reclamos, o dependiente/representante de reclamos y al empleado que hayan presentado esta petición dentro del plazo de **un día hábil** desde el momento de haber sido recibida la forma del empleado.

EL FIRMAR ESTA FORMA NO SIGNIFICA ADMISION DE RESPONSABILIDAD

☐ Employer copy
Copia del Empleador

☐ Employee copy
Copia del Empleado

☐ Claims Administrator
Administrador de Reclamos

☐ Temporary Receipt/
Recibo del Empleado

8.3 Notice of Occurrence - Accident/Incident Report – General Liability, Pollution, Builder's Risk



Notice of Occurrence ACCIDENT / INCIDENT REPORT – GENERAL LIABILITY/POLLUTION/BUILDERS RISK

Keenan & Associates 2355
Crenshaw Blvd. Torrance, CA 90501
www.SEWUP.ORG
Licence No. 0451271

| | | | | |
|----------|--|------------------------|----------------------|-----------------------------|
| Contact: | | Project Location Code: | Date of Loss & Time: | Date: |
| Phone: | | | | <input type="checkbox"/> AM |
| Cell: | | Carrier: | | <input type="checkbox"/> PM |
| Fax: | | | NAIC Code: | |
| Email: | | Policy No.: | Client ID No.: | |

School District

| | | | |
|---|---|----------------------------|------------------|
| Name of Insured: | | Insured's Mailing Address: | |
| Contact Name: | Title: | | |
| Primary Phone: <input type="checkbox"/> Bus <input type="checkbox"/> Cell | Secondary Phone: <input type="checkbox"/> Bus <input type="checkbox"/> Cell | Primary Email: | Secondary Email: |

Contractor

| | | | |
|---|---|----------------------------|-------------------|
| Name of Insured: | | Insured's Mailing Address: | |
| Contact Name: | Title: | | |
| Primary Phone: <input type="checkbox"/> Bus <input type="checkbox"/> Cell | Secondary Phone: <input type="checkbox"/> Bus <input type="checkbox"/> Cell | Primary E-mail: | Secondary E-mail: |

Occurrence

| | |
|--|---------------------------------|
| Location of Occurrence / Address (Describe Location if No Specific Address): | Police or Fire Dept. Contacted? |
| | Report No.: |
| Description of Occurrence: | |

Property

| | | | |
|--|---|--|---|
| Premises: Claimant (1) is: <input type="checkbox"/> Owner <input type="checkbox"/> Tenant <input type="checkbox"/> Insured Party | | Premises: Claimant (2) is: <input type="checkbox"/> Owner <input type="checkbox"/> Tenant <input type="checkbox"/> Insured Party | |
| Type of Damage: | | Type of Damage: | |
| Damaged Party (1) Name & Address (If not insured): | | Damaged Party (2) Name & Address (If not insured): | |
| Primary Phone: | <input type="checkbox"/> Home <input type="checkbox"/> Bus. <input type="checkbox"/> Cell | Primary Phone: | <input type="checkbox"/> Home <input type="checkbox"/> Bus. <input type="checkbox"/> Cell |
| Secondary Phone: | <input type="checkbox"/> Home <input type="checkbox"/> Bus. <input type="checkbox"/> Cell | Secondary Phone: | <input type="checkbox"/> Home <input type="checkbox"/> Bus. <input type="checkbox"/> Cell |
| Primary Email: | | Primary Email: | |
| Secondary Email: | | Secondary Email: | |
| Location of Property for Inspection: | | Location of Property for Inspection: | |

Injured Party

| | | | | | |
|--|------|-------------|--|------|-------------|
| Damaged Party (1) Name & Address (If not insured): | | | Damaged Party (2) Name & Address (If not insured): | | |
| Primary Phone: | | | Primary Phone: | | |
| <input type="checkbox"/> Home <input type="checkbox"/> Bus <input type="checkbox"/> Cell | | | <input type="checkbox"/> Home <input type="checkbox"/> Bus <input type="checkbox"/> Cell | | |
| Secondary Phone: | | | Secondary Phone: | | |
| <input type="checkbox"/> Home <input type="checkbox"/> Bus <input type="checkbox"/> Cell | | | <input type="checkbox"/> Home <input type="checkbox"/> Bus <input type="checkbox"/> Cell | | |
| Primary E-mail: | | | Primary E-mail: | | |
| Secondary E-mail: | | | Secondary E-mail: | | |
| Age: | Sex: | Occupation: | Age: | Sex: | Occupation: |
| Where Taken: | | | Where Taken: | | |
| Describe Injury: | | | Describe Injury: | | |
| What Was Injured Doing: | | | What Was Injured Doing: | | |

Witnesses

| | | | | | |
|--|--|--|--|--|--|
| Damaged Party (1) Name & Address (If not insured): | | | Damaged Party (2) Name & Address (If not insured): | | |
| Primary Phone: | | | Primary Phone: | | |
| <input type="checkbox"/> Home <input type="checkbox"/> Bus <input type="checkbox"/> Cell | | | <input type="checkbox"/> Home <input type="checkbox"/> Bus <input type="checkbox"/> Cell | | |
| Secondary Phone: | | | Secondary Phone: | | |
| <input type="checkbox"/> Home <input type="checkbox"/> Bus <input type="checkbox"/> Cell | | | <input type="checkbox"/> Home <input type="checkbox"/> Bus <input type="checkbox"/> Cell | | |
| Primary E-mail: | | | Primary E-mail: | | |
| Secondary E-mail: | | | Secondary E-mail: | | |

Remarks

| | | | |
|--------------|--|--------------|--|
| Reported By: | | Reported To: | |
| | | | |

9.0 Frequency Asked Questions (FAQs)

General

1. Who is insured under an Owner Controlled Insurance Program?

The Owner and all enrolled Contractors and their enrolled Subcontractors of any tier who perform operations at the Project Site described in the Contract Documents are insured under the OCIP.

2. Who is managing the Owner Controlled Insurance Program?

Keenan & Associates is the Program Administrator for this Owner Controlled Insurance Program, otherwise known as Statewide Educational Wrap Up Program (SEWUP).

3. Is Project Site Defined?

Yes. Project Site is on file with the insurance company, as described in the applicable Contract Documents.

4. What insurance is provided to Contractors/Subcontractors under the Owner Controlled Insurance Program (OCIP)?

The Owner has agreed to procure the following insurance:

- a. Workers' Compensation and Employer's Liability
- b. General Liability Insurance for Personal Injury, Bodily Injury and Property Damage Liability
- c. Builder's Risk
- d. Contractor's Pollution Liability (course of construction only)

5. Does the OCIP cover any contractor's equipment?

No. Contractors and Subcontractors must maintain this coverage.

6. Are there other types of insurance normally purchased by Contractors, which are not included?

Yes. Examples are:

- a. Bonds, if required by contract
- b. Contractor's Automobile Liability and Physical Damage Insurance
- c. Contractor's Equipment Floater

7. Does the Contractor/Subcontractor insured under the OCIP have to provide evidence of insurance?

Yes. The contract requires that, prior to commencement of on-site activities; each Contractor/Subcontractor shall furnish a Certificates of Insurance evidencing coverage for:

- a. Workers' Compensation
- b. General Liability

Certificates of Insurance and Additional Named Insured Endorsements, specifically naming the Owner, are also required for:

- a. Automobile Liability
- b. Any other required coverages outlined in the Contract and the Project Insurance Manual.

8. How is the Contractor/Subcontractor's bid to be submitted?

The Contractor/Subcontractor needs to submit their bid excluding certain insurance costs, as outlined in the Contract. Change Orders also need to be submitted without insurance costs.

9. When will the Contractor/Subcontractor receive a Certificate of Insurance insuring them under the OCIP?

Eligible Contractors/Subcontractors awarded a contract will be furnished a Certificate of Insurance upon Program Administrator's review and acceptance of the Contract Enrollment via WrapPortal.

10. Will all Contractors/Subcontractors receive information concerning their loss experience?

This information is available, upon request, from the Program Administrator.

11. How long are the policies kept in-force for the Contractor/Subcontractor?

The policy periods commence on the date of "Award" and terminate as defined in the Contract Documents. The only extension is for General Liability "Completed Operations" which is for ten (10) years after Notice of Completion filed by the District.

12. Does the OCIP provide coverage for truckers, vendors and suppliers?

No. Contractors/Subcontractors, whose sole duties are as truckers, vendors, or suppliers are not included in the program. If contracted with an on-site installer, vendors and/or suppliers should be enrolled in the OCIP for General Liability only, as it pertains to the contractual relationship of the installer's on-site work.

13. Are all Contractors/Subcontractors, of any tier, required to complete their own OCIP enrollment before they will be allowed to begin job site activity?

All Contractors/Subcontractors, regardless of tier, must complete a Contract Enrollment via WrapPortal, prior to commencement of on-site activities. Upon acceptance by the OCIP Administrator, each Contractor/Subcontractor will receive an enrollment confirmation packet, which includes a Certificate of Insurance evidencing the OCIP coverages.

14. What document do I use to show my Agent/Broker and Insurer that I'm covered under the OCIP?

All contractors enrolled under the OCIP program receive individual workers' compensation policies and Certificates of Insurance evidencing coverage under the OCIP program.

Workers' Compensation and Employers' Liability Insurance Questions

1. What insurance company writes the Workers' Compensation and Employer's Liability coverage?

Liberty Mutual Insurance Company.

2. What is the coverage term?

The coverage term for each Contractor/Subcontractor will coincide with the Start Date provided at OCIP enrollment. OCIP Workers' Compensation policies are renewed each year until receipt of OCIP Contractor's Completion Notice.

3. How will the Contractor/Subcontractor's payroll be classified?

Insurance Company will classify payrolls in accordance with California law under the Workers' Compensation Insurance Rating Bureau regulations, classifications, rates and rating plans. The Monthly Project Site Payroll Form will be used for Contractors/Subcontractors' monthly payroll submissions.

4. Will Program Administrator inspect the job and make recommendations regarding loss control and safety?

Yes. The Program Administrator will conduct periodic loss control surveys on behalf of the Owner. These surveys will focus on evaluating the contractors' efforts to control Workers' Compensation, General Liability, and Builders Risk exposures. These surveys are intended to assist contractors in identifying these exposures and take the appropriate actions to minimize the likelihood of loss.

5. Will there be other people who will make job site inspections?

Yes. The insurance company's Risk Engineer may conduct periodic site inspections to verify compliance with State requirements. State, City and Federal inspectors may also make inspections.

General Liability Insurance for Personal Injury, Bodily Injury and Property Damage Liability Questions

1. What insurance company writes the Personal Injury, Bodily Injury, and Property Damage Liability coverage?

Lloyds of London.

2. Is Completed Operations coverage provided beyond acceptance of the work performed under the Contract?

Yes. The extension for General Liability "completed operations" is for ten (10) years after Notice of Completion is filed by the Owner, or date Occupancy is taken.

10.0 Known Policy Exclusions

Worker's Compensation

Bodily Injury Outside US or Canada
Bodily Injury To Any Member of Flying Crew
Bodily Injury To Person Subject To Federal Workers' Compensation
Bodily Injury To Person Subject To Occupational Disease Laws
Contractual Liability
Employees Knowingly Employed Illegally
Employment Related Practices
Intentional or Aggravated Bodily Injury
Obligations Imposed By Disability Benefits or Any Similar Law
Obligations Imposed By Occupational Disease Laws
Obligations Imposed By Unemployment Compensation Laws
Obligations Imposed By Workers' Compensation Laws
State or Federal Law Violation Fines, Penalties

General Liability

Aircraft, Auto or Watercraft
Asbestos
Medical Payments Coverage
Certain Exclusions to Personal and Advertising Injury Liability
Certified Acts of Terrorism
Communicable Disease
Contractual Liability (Limited Coverage Provided)
Cross Suits – Limited
Cyber and Data
Employers Liability
Employment Related Practices
Expected or Intended Injury
Fungi Or Bacteria
Lead
Certain exclusions for transportation or use of
Mobile Equipment
Nuclear
Personal and Advertising Bodily Injury
Pollution and Hazardous Materials
Prior Continuous, or Progressively Deteriorating Injury or Damage
Professional Liability
Property Damage to the Project During the Course of Construction
Punitive Damages
Residential and Condominium Conversion
Recall of Products, Work Or Impaired Property

Silica or Silica Mixed Dust

Subsidence - Conditional Warranty – So long as Contractor/Subcontractors follows specifications of geotechnical/environmental reports then the exclusion will be waived; if not, exclusion will be fully implemented

Violation of Statutes Governing Collecting, Transmitting Information

Violation of Statutes Governing Email, Fax, Phone Calls

War

Workers Compensation and Similar Laws

Builder's Risk

Asbestos

Certain Offsite Property

Certain Release, Discharge, Escape, or Dispersal of Contaminants or Pollutants

Certified Acts of Terrorism (Optional Coverage)

Cessation of Work

Consequential Loss (except as provided in Delay in Opening Coverage)

Communicable Disease

Contractor's Tools, Machinery, Plans, Equipment

Cost of Making Good (Optional Coverage)

Damage to Existing Property (Optional Coverage)

Damage While Testing Prototype or Used Machinery/Equipment

Damages, Fines, Penalties at Government Agency or Court Order

Disappearance or When Revealed by Inventory Shortage Alone

Earth Movement (Optional Coverage)

Electrical, Magnetic, or Errors Related to Electronic Records

Financial Accounts, Instruments, Stamps, Deeds, Precious Material

Flood (Optional Coverage) (rain and the accumulation of rainwater included in Flood definition)

Foreign Terrorism

Infidelity, Dishonesty, Fraudulent Activity of Insured

Land, Values of Land, Cut, & Fill etc. Prior to Project Commencement

Loss Under Any Manufacturer or Supplier Guarantee/Warranty

Normal Subsidence

Nuclear

Offshore or Barrier Island Property

Property That Stores, Processes, or Handles Radioactive Materials

Rolling Stock, Aircraft, Watercraft

Software Loss, unless results from an Open Peril

Standing Timber, Growing Crops, Animals

Vehicles or Equipment Licensed For Highway Use

War and Military Action

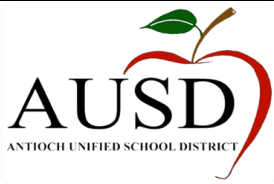
Contractors Pollution Liability

Auto, Aircraft, Vessel Or Rolling Stock

Claims Between Certain Insureds

Contractual Liability

Damage To Property
Fines, Penalties, and Treble Damages
Employment Related Practices
Owned Hazardous Materials Facility
Nuclear
Other Entities
Pre-Existing Conditions
Products
Terrorism
War
Workers Compensation and Similar Laws



2025

2026

June

July

August

September

October

November

December

January

February

March

April

May

Jack London Elementary - Boiler & Chiller Replacement Project: MILESTONE SCHEDULE

| DESCRIPTION | START | END | DURATION | | | | | | | | | | | | |
|---|----------|----------|----------|---------|---------|---------|--|--|----------|----------|--|--|--------|--------|---------|
| 1st Advertisement* | 7/18/25 | 7/18/25 | * | | 7/18/25 | | | | | | | | | | |
| Mandatory Pre-Bid Job Walk** | 7/24/25 | 7/24/25 | * | | 7/24/25 | | | | | | | | | | |
| 2nd Advertisement* | 7/25/25 | 7/25/25 | * | | 7/25/25 | | | | | | | | | | |
| Last Day for Pre-Bid RFI's/Questions* | 7/30/25 | 7/30/25 | * | | 7/30/25 | | | | | | | | | | |
| Sealed Bids Due Date*** | 8/5/25 | 8/5/25 | * | | | 8/5/25 | | | | | | | | | |
| Award by AUSD Board* | 8/27/25 | 8/27/25 | * | | | 8/27/25 | | | | | | | | | |
| Issue Notice of Award to Prime Contractor* | 8/28/25 | 8/28/25 | * | | | 8/28/25 | | | | | | | | | |
| Submittal & Procurement Period | 8/28/25 | 12/22/25 | 32-weeks | | | 8/28/25 | | | | 12/22/25 | | | | | |
| Anticipated Lead Time for Boiler | 8/28/25 | 11/20/25 | 12-weeks | | | 8/28/25 | | | 11/20/25 | | | | | | |
| Anticipated Lead Time for Chiller (OFCL) | 6/30/25 | 12/1/25 | 22-weeks | 6/30/25 | | | | | | 12/1/25 | | | | | |
| On-Site Construction Period | 12/22/25 | 5/15/26 | | | | | | | | 12/22/25 | | | | | 5/15/26 |
| Chiller Installation | 12/22/25 | 3/2/26 | 10-weeks | | | | | | | 12/22/25 | | | 3/2/26 | | |
| Substantial Completion of Chiller Installation* | 3/2/26 | 3/2/26 | * | | | | | | | | | | 3/2/26 | | |
| Boiler Installation | 4/6/26 | 5/15/26 | 6-weeks | | | | | | | | | | | 4/6/26 | 5/15/26 |
| Substantial Completion of Boiler Installation* | 5/15/26 | 5/15/26 | * | | | | | | | | | | | | 5/15/26 |
| Final Completion of Project* | 5/15/26 | 5/15/26 | * | | | | | | | | | | | | 5/15/26 |

* = MILESTONE

** = Mandatory Pre-Bid Job Walk: **Thursday, July 24, 2025 @ 10:00 AM** at front of Jack London Elementary School, 4550 Country Hills Drive; Antioch, CA 94531

*** = Bids Due: **Tuesday, August 5, 2025 @ 2:00 PM** at Antioch USD Facilities Office 701 W 18th St.; Antioch, CA 94509

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SECTION 01 74 00

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 00 and 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Salvaging non-hazardous demolition and construction waste.
 - 2. Recycling non-hazardous demolition and construction waste.
 - 3. Disposing of nonhazardous demolition and construction waste.
- B. Related Requirements:
 - 1. Division 01 Section "CalGreen Requirements".

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 Authority Having Jurisdiction (AHJ).
- 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 REGULATORY REQUIREMENTS

- A. Regulatory Requirements: Modernization shall meet the mandatory requirements of 2022 California Green Building Standards Code as adopted by DSA and local Authority Having Jurisdiction (AHJ) whichever is more stringent:

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL 01 74 00 - 1

1. 5.408.1 Construction Waste Management: Recycle and salvage for reuse a minimum of 65 percent of the nonhazardous construction and demolition waste in accordance with Section 5.408.1.1; 5.408.1.2; 5.408.1.3; or meet a local construction and demolition waste management ordinance, whichever is more stringent.
2. 5.408.1.1 Construction Waste Management Plan: Where a local AHJ does not have a construction and demolition waste management ordinance that is more stringent, submit a construction 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. Determine 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 that the amount of construction and demolition waste materials diverted shall be calculated by weight or volume, but not by both.
3. 5.408.1.2 Waste Management Company: 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 this section. The District and Contractor shall make the determination if the construction and demolition waste material will be diverted by a waste management company. See CALGreen 5.408.1.2 for exceptions to this Section. Waste Management Company shall be approved by local AHJ.
4. 5.408.1.3 Waste Stream Reduction Alternative: 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 50 percent minimum requirement as approved by the enforcing agency.

1.5 PERFORMANCE REQUIREMENTS

- A. General: Recycle and salvage nonhazardous construction and demolition debris. Develop and implement a construction waste management plan that, at a minimum, identifies the materials to be diverted from disposal and whether the materials will be sorted on-site or comingled. Excavated soil and land-clearing debris do not contribute to this credit. Calculations can be done by weight or volume, but not both, and must be consistent throughout.
- B. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials.

1.6 INFORMATIONAL SUBMITTALS

- A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Include the following information:
 1. Material category.
 2. Generation point of waste.
 3. Total quantity of waste in tons.

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL 01 74 00 - 2

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.

1.7 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with hauling and disposal regulations of local AHJ.
- B. Waste Management Conference: Conduct conference at Project site. Review methods and procedures related to waste management including, but not limited to, the following:
 1. Review and discuss waste management plan including responsibilities of waste management coordinator.
 2. Review requirements for documenting quantities of each type of waste and its disposition.
 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
 5. Review waste management requirements for each trade.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL 01 74 00 - 3

- B. 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.

3.2 SALVAGING DEMOLITION WASTE

- A. Salvaged Items for Reuse 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, support, and miscellaneous materials necessary to make items functional for use indicated.
- B. Salvaged Items for Sale and Donation: Not permitted on Project site.
- C. Salvaged Items for District's Use: Salvage items for District'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 District.
 - 4. Transport items to District's storage area designated by District.
 - 5. Protect items from damage during transport and storage.
- D. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panel boards, 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 Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to District.
- C. 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.
- D. 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 District's property and transport to recycling receiver or processor.

3.4 RECYCLING DEMOLITION WASTE

- A. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.
- B. 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.
- C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.
- D. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.
- E. Metal Suspension System: Separate metal members including trim, and other metals from acoustical panels and tile and sort with other metals.
- F. 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. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Wood Materials:
 1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
 2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

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

3.6 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, removed waste materials taken from Project site shall be legally disposed of by certified construction and demolition recovery facility acceptable to AHJ.
 - 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.

END OF SECTION

SECTION 01 81 13

CALGREEN REQUIREMENTS

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 general requirements and procedures for compliance with 2022 California Green Building Standards Code, "CALGreen", California Code of Regulations, Title 24, Part 11 as adopted by Division of the State Architect (DSA).

- 1. Project shall comply with all CALGreen "Nonresidential Mandatory Measures" as adopted by Division of the State Architect (DSA).

- B. Related Sections:

- 1. Divisions 01 through 33 Sections for specific building measures applicable to those Sections.

1.3 DEFINITIONS

- A. "CALGreen": Shall mean "2022 California Green Building Standards Code, CALGreen, California Code of Regulations, Title 24, Part 11" as adopted by Division of the State Architect (DSA).

- 1. Definitions, abbreviations, and acronyms that are a part of "CALGreen" apply to this Section.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Meetings: Conduct meeting at Project site. Review CALGreen requirements and action plans for complying with requirements.

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Respond to questions and requests from Architect and submit documentation for CALGreen prerequisites and credits that are the responsibility of the Contractor, that depend on product selection or product qualities, or that depend on Contractor's procedures. Document responses as informational submittals.

1.6 ACTION SUBMITTALS

- A. Submit CALGreen submittals in accordance with requirements of Division 01 through 33 Sections.

- B. CALGreen submittals are in addition to other submittals.

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- C. If submitted item is identical to that submitted to comply with other requirements, include an additional copy with other submittal as a record copy of compliance with indicated CALGreen requirements instead of separate sustainable design submittal. Mark additional copy "CALGreen Submittal."

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For CALGreen coordinator.

1.4 QUALITY ASSURANCE

- A. Project Management and Coordination: Contractor to identify one person on Contractor's staff to be responsible for CALGreen compliance and coordination.
 - 1. Experience: Environmental project manager to have experience relating to CALGreen building construction.
 - 2. Responsibilities: Review Contract Documents for CALGreen requirements and coordinate work of trades, subcontractors, and suppliers.
 - a. Assemble and retain approved CALGreen Submittals, tabulation charts and other records to document progress toward meeting CALGreen requirements.
 - b. Provide records in secure jobsite location, available for review by Architect or Owner.
 - c. Provide Action Plans, Progress Reports, and final documentation according to specified requirements and schedule.
 - d. Meetings: Lead Contractor and trade discussion of CALGreen goals and requirements at following meetings:
 - a. Pre-construction meetings, including pre-construction CALGreen trades and training meeting.
 - b. Waste management conference.
 - c. Pre-installation meetings.
 - d. Regularly scheduled job-site meetings.
 - e. Special CALGreen issues meetings.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- 1. Provide products and procedures necessary to comply with CALGreen building requirements. General CALGreen compliance requirements are specified herein. Specific CALGreen requirements for work of each Section are specified in Divisions 02 through 33. Where required Contractor shall determine additional materials and procedures necessary to comply with all required CALGreen requirements.

2.2 ENVIRONMENTAL QUALITY

- A. CALGreen Section 5.504.1, Temporary Ventilation: The permanent HVAC system shall only be used during construction if necessary, to condition the building or areas of addition or alteration within the required temperature range for material and equipment installation. If the HVAC system is used during construction, use return air filters with Minimum Efficiency Reporting Value (MERV) of 8, based on ASHRAE 52.2-1999 or an average efficiency of 30

percent based on ASHRAE 52.1-1992. Replace all filters immediately prior to occupancy, or, if the building is occupied during alteration, at the conclusion of construction.

- B. CALGreen Section 5.504.3, Covering of Duct Openings and Protection of Mechanical Equipment During Construction: At time of rough installation and during storage on the construction site until final startup of the heating, cooling and ventilating equipment, all duct and other related air distribution component openings shall be covered with tape, plastic, sheet metal or other methods acceptable to enforcing agency to reduce the amount of dust, water and debris which may enter the system.
- C. CALGreen Section 5.504.4, Finish Material Pollutant Control: Finish material shall comply with Sections 5.504.4.1 through 5.504.4.6.
- D. CALGreen Section 5.504.4.1, Adhesives, Sealants and Caulks: Adhesives and sealants used on Project shall meet requirements of CALGreen 5.504.4.1 and shall be compliant with VOC and other toxic compound limits in accordance with following CALGreen Table 5.504.4.1 and Table 5.504.4.2.

TABLE 5.504.4.1

ADHESIVE VOC LIMIT^{1,2} Less Water and Less Exempt Compounds in Grams Per Liter

| ARCHITECTURAL APPLICATIONS | CURRENT VOC LIMIT |
|--|-------------------|
| Indoor carpet adhesives | 50 |
| Carpet pad adhesives | 50 |
| Outdoor carpet adhesives | 150 |
| Wood flooring adhesive | 100 |
| Rubber floor adhesives | 60 |
| Subfloor adhesives | 50 |
| Ceramic tile adhesives | 65 |
| VCT and asphalt tile adhesives | 50 |
| Drywall and panel adhesives | 50 |
| Cove base adhesives | 50 |
| Multipurpose construction adhesives | 70 |
| Structural glazing adhesives | 100 |
| Single-ply roof membrane adhesives | 250 |
| Other adhesive not specifically listed | 50 |
| SPECIALTY APPLICATIONS | |
| PVC welding | 510 |
| CPVC welding | 490 |
| ABS welding | 325 |
| Plastic cement welding | 250 |
| Adhesive primer for plastic | 550 |
| Contact adhesive | 80 |
| Special purpose contact adhesive | 250 |
| Structural wood member adhesive | 140 |
| Top and trim adhesive | 250 |
| SUBSTRATE SPECIFIC APPLICATIONS | |
| Metal to metal | 30 |
| Plastic foams | 50 |
| Porous material (except wood) | 50 |
| Wood | 30 |
| Fiberglass | 80 |

1. If an adhesive is used to bond dissimilar substrates together the adhesive with the highest VOC content shall be allowed.

2. For additional information regarding methods to measure the VOC content specified in this table, see South Coast Air Quality Management District Rule 116B, <http://www.arb.ca.gov/DRDB/SC/CURHTML/R116B.PDF>.

TABLE 5.504.4.2

SEALANT VOC LIMIT Less Water and Less Exempt Compounds in Grams per Liter

| SEALANTS | CURRENT VOC LIMIT |
|--------------------------|-------------------|
| Architectural | 250 |
| Marine deck | 760 |
| Nonmembrane roof | 300 |
| Roadway | 250 |
| Single-ply roof membrane | 450 |
| Other | 420 |
| SEALANT PRIMERS | |
| Architectural | |
| Nonporous | 250 |
| Porous | 775 |
| Modified bituminous | 500 |
| Marine deck | 760 |
| Other | 750 |

Note: For additional information regarding methods to measure the VOC content specified in these tables, see South Coast Air Quality Management District Rule 116B.

- E. CALGreen Section 5.504.4.3, Paints and Coatings: Paints, stains and other coatings used on Project shall meet requirements of CALGreen 5.504.4.3 and shall be compliant with VOC and other toxic compound limits in accordance with following CALGreen Table 5.504.4.3.

TABLE 5.504.4.3

VOC CONTENT LIMITS FOR ARCHITECTURAL COATINGS^{2, 3} Grams of VOC per Liter of Coating, Less Water and Less Exempt Compounds

| COATING CATEGORY | CURRENT LIMIT |
|-------------------------------------|---------------|
| Flat coatings | 50 |
| Nonflat coatings | 100 |
| Nonflat-high gloss coatings | 150 |
| SPECIALTY COATINGS | |
| Aluminum roof coatings | 400 |
| Basement specialty coatings | 400 |
| Bituminous roof coatings | 50 |
| Bituminous roof primers | 350 |
| Bond breakers | 350 |
| Concrete curing compounds | 350 |
| Concrete/masonry sealers | 100 |
| Driveway sealers | 50 |
| Dry fog coatings | 150 |
| Faux finishing coatings | 350 |
| Fire resistive coatings | 350 |
| Floor coatings | 100 |
| Form-release compounds | 250 |
| Graphic arts coatings (sign paints) | 500 |

| | |
|---|-----|
| High temperature coatings | 420 |
| Industrial maintenance coatings | 250 |
| Low solids coatings ¹ | 120 |
| Magnesite cement coatings | 450 |
| Mastic texture coatings | 100 |
| Metallic pigmented coatings | 500 |
| Multicolor coatings | 250 |
| Pretreatment wash primers | 420 |
| Primers, sealers and undercoaters | 100 |
| Reactive penetrating sealers | 350 |
| Recycled coatings | 250 |
| Roof coatings | 50 |
| Rust preventative coatings | 250 |
| Shellacs | |
| Clear | 730 |
| Opaque | 550 |
| Specialty primers, sealers and undercoaters | 100 |
| Stains | 250 |
| Stone consolidants | 450 |
| Swimming pool coatings | 340 |
| Traffic marking coatings | 100 |
| Tub and tile refinish coatings | 420 |
| Waterproofing membranes | 250 |
| Wood coatings | 275 |
| Wood preservatives | 350 |
| Zinc-rich primers | 340 |

1. Grams of VOC per liter of coating, including water and including exempt compounds.

2. The specified limits remain in effect unless revised limits are listed in subsequent columns in the table.

3. Values in this table are derived from those specified by the California Air Resources Board, Architectural Coatings Suggested Control Measure, February 1, 2008. More information is available from the Air Resources Board.

CALGREEN REQUIREMENTS 01 81 13 - 7

- F. CALGreen Section 5.504.4.3.1, Aerosol Paints and Coatings: Aerosol paints and other coatings used on Project shall meet the PWMIR Limits for VOC in Section 94522 (a) (3) and other requirements of this Section. See CALGreen for full requirements. Verification of compliance with this section shall be provided at the request of the enforcing agency.
- G. CALGreen Sections 5.504.4.4, Carpet Systems through 5.504.4.4.2, Carpet Adhesives:
1. All carpet installed in the building interior shall meet at least one of the following testing and product requirements:
 - a. Carpet and Rug Institute's Green Label Plus Program.
 - b. Compliant with the VOC-emission and testing requirements specified in the California Department of Public Health Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers", Version 1.1, February 2010 (also known as CDPH Standard Method V1.1 or Specification 01350);
 - c. NSF/ANSI 140 at the Gold level or higher;
 - d. Scientific Certifications Systems Sustainable Choice; or
 - e. Compliant with the Collaborative for High Performance Schools California (CA-CHPS) Criteria as listed in the CHPS High Performance Product Database.
 2. Carpeting Cushions: All carpet cushion installed in the Building interior shall meet the requirements of the Carpet and Rug Institute's Green Label program.
 3. Carpet Adhesive: All carpet adhesives shall meet the requirements of following Table 4.504.4.1.

TABLE 5.504.4.1

**ADHESIVE VOC LIMIT^{1,2} Less Water and Less Exempt Compounds in Grams Per
Liter**

| ARCHITECTURAL APPLICATIONS | CURRENT VOC LIMIT |
|--|-------------------|
| Indoor carpet adhesives | 50 |
| Carpet pad adhesives | 50 |
| Outdoor carpet adhesives | 150 |
| Wood flooring adhesive | 100 |
| Rubber floor adhesives | 60 |
| Subfloor adhesives | 50 |
| Ceramic tile adhesives | 65 |
| VCT and asphalt tile adhesives | 50 |
| Drywall and panel adhesives | 50 |
| Cove base adhesives | 50 |
| Multipurpose construction adhesives | 70 |
| Structural glazing adhesives | 100 |
| Single-ply roof membrane adhesives | 250 |
| Other adhesive not specifically listed | 50 |
| SPECIALTY APPLICATIONS | |
| PVC welding | 510 |
| CPVC welding | 490 |
| ABS welding | 325 |
| Plastic cement welding | 250 |
| Adhesive primer for plastic | 550 |
| Contact adhesive | 80 |
| Special purpose contact adhesive | 250 |
| Structural wood member adhesive | 140 |
| Top and trim adhesive | 250 |
| SUBSTRATE SPECIFIC APPLICATIONS | |
| Metal to metal | 30 |
| Plastic foams | 50 |
| Porous material (except wood) | 50 |
| Wood | 30 |
| Fiberglass | 80 |

1. If an adhesive is used to bond dissimilar substrates together the adhesive with the highest VOC content shall be allowed.

2. For additional information regarding methods to measure the VOC content specified in this table, see South Coast Air Quality Management District Rule 1168, <http://www.arb.ca.gov/DRDB/SC/CURHTML/R1168.PDF>.

- H. CALGreen Section 5.504.4.5, Composite Wood Products: Hardwood plywood, particleboard and medium density fiberboard composite wood products used on the interior or exterior of the building shall meet the requirements for formaldehyde as specified in ARB's Air Toxics Control measure (ATCM) for Composite Wood (17 CR 93120 et seq.). Those materials not exempted by the ATCM must meet the specified emission limits as shown in Table 5.504.4.5.
1. Verification of compliance with this section shall be provided as requested by the enforcing agency. Documentation shall be in accordance with CALGreen 5.504.4.5.3.
- I. CALGreen Section 5.504.4.6, Resilient Flooring Systems: For 80 percent of floor area receiving resilient flooring, installed resilient flooring shall meet at least one of the following:
1. Certified under the Resilient Floor Covering Institute (RFCI) FloorScore program;
 2. Compliant with the VOC emission limits and testing requirements specified in the California Department of Public Health's 2010 Standard Method for the Testing and Evaluation Chambers, Version 1.1, February 2010;
 3. Compliant with the Collaborative for High Performance Schools California (CA-CHPS) Criteria as listed in the CHPS High Performance Product Database; or
 4. Products certified under UL GREENGUARD Gold (formerly the Greenguard Children's & Schools Program).
 5. CALGreen Section 5.504.4.6.1, Verification of Compliance: Documentation shall be provided verifying that resilient flooring materials meet the pollutant emission limits.
- J. CALGreen Section 5.504.5.3, Filters: In mechanically ventilated buildings, provide regularly occupied areas of the building with air filtration media for outside and return air that provides at least a Minimum Efficiency Reporting Value (MERV) of 13. MERV 13 filters shall be installed prior to occupancy, and recommendations for maintenance with filters of the same value shall be included in the operation and maintenance manual.
1. Exceptions:
 - a. Existing mechanical equipment.
 2. CALGreen 5.504.5.3.1, Labeling: Installed filters shall be clearly labeled by the manufacturer indicating the MERV rating.
- K. CALGreen Section 5.504.7, Environmental Tobacco Smoke (ETS) Control: Where outdoor areas are provided for smoking, prohibit smoking within 25 feet of building entries, outdoor air intakes and operable windows and within the building as already prohibited by other laws or regulations; or as enforced by ordinances, regulations, or policies of any Authority Having Jurisdiction. When ordinances, regulations or policies are not in place, post signage to inform building occupants of the prohibitions.
- L. CALGreen Section 5.505.1, Indoor Moisture Control: Buildings shall meet or exceed the provisions of California Building Code, CCR, Title 24, Part 2, Sections 1202 (Ventilation) and Chapter 14 (Exterior Walls) for additional measures not applicable to low-rise residential occupancies, see Section 5.407.2 of this code.
- M. CALGreen Section 5.506.1 Outside Air Delivery: For mechanically or naturally ventilated spaces in buildings, meet the minimum requirements of Section 120.1 (Requirements for

Ventilation) of the California Energy Code, or the applicable local code, whichever is more stringent, and Division 1, Chapter 4 of CCR, Title 8.

- N. CALGreen Section 5.507.4, Acoustical Control: Employ building assemblies and components with Sound Transmission Class (STC) values determined in accordance with ASTM E 90 and ASTM E413 or Outdoor-Indoor Sound Transmission Class (OITC) determined in accordance with ASTM E 1332, using either the prescriptive or performance method in Section 5.507.4.1 or 5.507.4.2.
1. Exception: Buildings with few or no occupants or where occupants are not likely to be affected by exterior noise, as determined by the enforcement authority, such as factories, stadiums, storage, enclosed parking structures and utility buildings.
 2. Exception: [DSA-SS] For public schools and community colleges, the requirement of this section and all subsections apply only to new construction.
 3. CalGreen Section 5.507.4.1, Exteriors Noise Transmission, Prescriptive Method: Wall and roof-ceiling assemblies exposed to the noise source making up the building or addition envelope or altered envelope shall meet a composite STC rating of at least 50 or a composite OITC rating of no less than 40, with exterior windows of a minimum STC of 40 or OITC of 30 in the following locations:
 - a. Within the 65 CNEL noise contour of an airport.
 - 1) Exceptions:
 - a) L_{dn} or CNEL for military airports shall be determined by the facility Air Installation Compatible land Use Zone (AICUZ) plan.
 - b) L_{dn} or CNEL for other airports shall and heliports for which a land use plan has not been developed shall be determined by the local general plan noise element.
 - 2) Within the 65 CNEL or L_{dn} noise contour of a freeway or expressway, railroad, industrial source, or fixed-guideway source as determined by the Noise Element of the General Plan.
 - b. CALGreen Section 5.507.4.1.1, Noise Exposure Where Noise Contours are not Readily Available: Buildings exposed to a noise level of 65 $dB_{Leq-1-hr}$ during any hour of operation shall have building, addition or alteration exterior wall and roof-ceiling assemblies exposed to the noise source meeting a composite STC rating of at least 45 (or OITC 35), with exterior windows of a minimum STC of 40 (or OITC 30).
- O. CALGreen Section 5.507.4.2, Performance Method: For building located as defined in Section 5.507.4.1 or 5.507.4.1.1, wall and roof-ceiling assemblies exposed to the noise source making up the building or addition envelope or altered envelope shall be constructed to provide an interior noise environment attributable to exterior sources that does not exceed an hourly equivalent noise level (L_{eq-Hr}) of 50 dBA in occupied areas during any hour of operation.
1. CALGreen 5.507.4.2.1, Site Features: Exterior features such as sound wall or earth berms may be utilized as appropriate to the building, addition, or alteration project to mitigate sound migration to the interior.

- P. CALGreen Section 5.507.4.3, Interior Sound Transmission: Wall and floor-ceiling assemblies separating tenant spaces and public places shall have an STC of at least 40.
 - 1. Note: Examples of assemblies and their various STC rating may be found at the California Office of Noise Control website.
- Q. CALGreen Section 5.508.1 Ozone Depletion and Greenhouse Gas Reductions: Installations of HVAC, refrigeration and fire suppression equipment shall comply with Sections 5.508.1.1 and 5.508.1.2.
 - 1. CALGreen Section 5.508.1.1 Chlorofluorocarbons (CFC's): Install HVAC, refrigeration and fire suppression equipment that do not contain CFC's.
 - 2. CALGreen Section 5.508.1.2 Halons: Install HVAC, refrigeration and fire suppression equipment that do not contain Halons.

PART 3 - EXECUTION

3.1 VERIFICATION

- A. Verification, certification, and performance testing for compliance with CALGreen requirements shall be provided by the Contractor. Documentation shall be provided by Contractor to verify compliance with CALGreen materials and measures above.

END OF SECTION

SECTION 01 91 13 – GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Submittals, and other Division 1 Specification Sections, apply to this Section.
- B. OPR and BoD documentation are included by reference for information only.

1.2 SUMMARY

- A. Section Includes:
 - 1. Commissioning Team
 - 2. Commissioning Meetings
 - 3. Construction Checklist Overview
 - 4. Controls Verification
 - 5. Functional Performance Testing
 - 6. Training Development
 - 7. Commissioning Plan
- B. Related Sections
 - 1. Closeout Procedures: Divisions 1
 - 2. Commissioning of Plumbing: Division 22
 - 3. Commissioning of HVAC: Division 23
 - 4. Testing, Adjusting, and Balancing for HVAC: Division 23
 - 5. Commissioning of Electrical: Division 26
 - 6. All applicable provisions of the remaining divisions also apply to this section.

1.3 DEFINITIONS

- A. BoD: Basis of Design. A document, prepared by Engineer, that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.
- B. Commissioning Plan: A document, prepared by CxA, that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.
- C. CxA: Commissioning Authority.
- D. OPR: Owner's Project Requirements. A document, prepared by CxA that details the functional requirements of a Project and expectations of how it will be used and operated. This document includes Project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.
- E. Systems, Assemblies, Equipment, and Components: Where these terms are used together or separately, they shall mean "as-built" systems, assemblies, equipment, and components.
- F. TAB: Testing, Adjusting, and Balancing.

1.4 DESCRIPTION

- A. Antioch Unified School District has elected to use the Commissioning Process as part of their quality assurance process to design, construct, and operate this building. As with any quality process, Commissioning provides tools to enable everyone involved in the construction of a building to verify the final building meets the original intent of the Owner. A primary tool used is the completion of startup forms (or pre-functional checklists) by individual workers and/or the CxA. The checklists are simple to fill out and easily track the current state of work by providing the key criteria in the specifications the Owner has defined as important for the successful installation and long-term operation of systems and equipment.
- B. A key component of Commissioning is the verification of the operation of heating, cooling and lighting systems in all modes of operation to ensure the building is ready for year-round occupancy.
- C. The commissioning scope of work shall encompass all new mechanical (HVAC) systems, energy management systems (EMS) or Building Automation systems (BAS), lighting control systems (including exterior lights), domestic water heating systems, and irrigation controllers.

1.5 INCLUDED SYSTEMS

- A. The following systems and their components are the focus of the Commissioning Process due to their complexity and the need to have coordination among the various subcontractors (as applicable to project):
 - 1) Chillers
 - 2) Boilers
 - 3) Primary & Secondary Pumps

1.6 SCHEDULE

- A. The Contractor shall provide the Commissioning Authority (CxA) with a detailed construction schedule within 30 days of the commencement of work. The Contractor shall also provide the Commissioning Authority (CxA) with construction schedule updates throughout the construction period. Schedules shall include all submittals; equipment start-up activities; ductwork testing; pipe flushing; Test, Adjust, and Balance; and Owner training. The CxA will provide the Contractor with commissioning activities into the overall project schedule.
- B. Contractor shall notify CxA 14-days prior to equipment startup, ductwork testing, pipe testing and flushing, water treatment certification, and AHJ inspections. All documentation shall be sent to CxA for record.
- C. Contractor shall complete pre-functional checklists (or startup forms) and installation checklists.
- D. Contractor shall provide CxA coordinated shop drawings monthly or as requested to verify that all trades are coordinating in a reasonable and logical manner.
- E. Contractor shall submit proposed startup procedures for review 14-days prior to startup.
- F. Contractor shall submit completed startup reports prior to scheduling Cx testing which includes Pre-functional testing and Functional testing.
- G. Controls contractor shall submit trending for review to CxA 7-days prior to functional performance testing. Trending duration shall be for 7-days on 15-minute intervals and shall include all points as requested by CxA. Functional testing will not be scheduled prior to CxA and Owner approving trends.

- H. FPT (Functional Performance Test) procedures will be developed by the CxA (see item 3.14). The contractor shall return consolidated comments from all subcontractors within 14 days of receipt from the CxA.
- I. Contractor shall be responsible for participating in functional performance testing at the end of construction.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 COMMISSIONING TEAM

- A. The General Contractor and each subcontractor shall designate a single individual to be responsible for coordinating Cx activities with Owner and CxA.
- B. The members of the commissioning team consist of Owner, Owner O&M personnel, Prime Contractor, either the General Contractor (GC) or the Mechanical Contractor (MC), the Electrical Subcontractor(s) (ES), the Testing Adjusting and Balancing (TAB) subcontractor, the Controls Subcontractor (CS), the Plumbing subcontractor (PC) and the Commissioning Authority (CxA).

3.2 COMMISSIONING MEETINGS

- A. All commissioning team members shall attend preconstruction Cx meeting. The meeting will be to discuss the Cx process, scheduled activities, and Cx team responsibilities.
- B. Commissioning meetings will be held throughout the duration of construction and will typically follow a scheduled project coordination meeting. Commissioning meetings will be separate from other meetings and will have their own agenda and meeting minutes. The CxA will lead, distribute agendas, and record meeting minutes for Cx meetings. The meetings are not to be redundant to other meetings and will be to discuss quality issues and commissioning activities.

3.3 COMMISSIONING PLAN

- A. A detailed commissioning plan containing the OPR, designer's Basis of Design (if available), and a compilation of all test forms will be provided and reviewed with the subcontractors during the pre-construction Cx meeting.
- B. The commissioning plan is intended only as a guide for commissioning activities on the project. The specifications are the contract requirements and shall be considered the extent of the subcontractor's responsibilities.

3.4 DOCUMENTATION

- A. Contractor shall notify CxA 14-days prior to equipment startup, ductwork testing, pipe testing and flushing, water treatment certification, and AHJ inspections. All documentation shall be sent to CxA for record.

3.5 SUBMITTAL REVIEWS

- A. A/E and Owner shall review submittals. The intent of this review is to identify long-term issues of submitted equipment and to ensure the original design intent is maintained throughout the design and construction phases.

The CxA will review the submittals as a secondary review for the Owner.

- B. The Contractor shall send submittals to the Engineer. The focus of the review will be:
 - 1. Verify that the equipment or system meets the Owner's Project Requirements.
 - 2. Verify that equipment or system includes provisions for access and maintenance.
- C. The A/E after the review will return a list of comments to the Contractor.
 - 1. The A/E will review and return a single comment list to the Contractor.
 - 2. A/E will send copy of the A/E comments to the CxA to incorporate in the Cx process.

3.6 CONSTRUCTION CHECKLIST OVERVIEW

- A. The intent of the construction checklist is to provide a formalized means to easily track construction progress and to provide individual workers the key criteria for a successful installation.
 - 1. Pre-functional checklists are described in detail below. These are equipment-specific.
 - 2. Checklists for piping, ductwork, cable trays, wiring, etc. are different from the pre-functional checklists. Although they are not formally tracked, they will be used by the CxA during periodic site observations. These checklist items are reminders to the contractors of some common items that have been problematic on other projects.
- B. Construction checklists for all pieces of equipment typically follow the same format, yet are tailored to the specific equipment being installed.
- C. Pre-functional checklists are developed for each individual piece of equipment to track and verify equipment from when they are delivered, installed, and started up. The contractor will be provided with all checklists developed for each piece of equipment or system and the following:
 - 1. Instructions and Checklist Procedures.
 - 2. Checklists with the following sections:
 - a. Pre-Installation Checks: Includes several yes/no or short answer questions to document the condition of the equipment prior to installation and several blank columns to compare delivery items such as manufacturer, model, serial no., etc. to the corresponding submitted/approved items.
 - b. Installation and Startup: Includes several yes/no or short answer questions to document that the equipment is installed, electrically wired, controlled and started up and balanced according to the specified requirements. A Negative Responses section is included at the end of the checklist to document the reasons for any "no" responses or discrepancies in the various sections. A space is included to document the actions taken to correct the problems resulting in "no" responses.
- D. The checklist shall be completed by the individual actually completing the work. Prior to any work, the checklist shall be reviewed by the individual contractor for pertinent information. Any negative responses on the checklist shall be explained and documented at the end of the checklist. The CxA will review each checklist with the respective contractor(s) prior to the installation of the first component of an item (e.g., the first unit heater) to ensure they understand the use of the checklist.
- E. The completion of the checklist does not eliminate the contractor's responsibility for meeting other requirements in the specifications and drawings.
- F. The CxA will periodically verify the accuracy, completeness and tracking of the checklists. If consistent errors are found, the responsible contractor shall re-validate 100% of the checklists for the problem equipment or system type.

- G. The Checklists are designed to detect and eliminate delivery, installation and startup problems, and problems with miscommunication. This process also serves as a convenient way to document the progress of the work.

3.7 SITE OBSERVATION AND ISSUES LOG

- A. The CxA will perform routine site observations during the construction period.
- B. The CxA will maintain an Issues Log that will include construction issues, access and maintenance issues, safety issues, or other issues. Each observation is intended to improve the project quality and achieve the OPR.
- C. The CxA Issue Logs are not “punch lists” in that they focus on systemic problems. Where an issue is identified, not all of the same components will have been verified by the CxA.
- D. Issue Logs shall be responded to within 7-days.

3.8 START-UP

- A. Startup reports shall be prepared prior to start-up and submitted to Cx Team for A/E, Owner, and CxA to review.
- B. Startup documentation shall contain a minimum of all startup procedures recommended by manufacturer and shall encompass all accessories and sensor calibration.
- C. Completed start-up reports shall be submitted 7-days prior to scheduled functional performance testing. Start-up reports shall be type written on contractor’s letterhead.

3.9 O&M MANUALS

- A. The lead subcontractor for the respective system is responsible for the delivery of O&M Manuals and Warranties to the Owner.
- B. A/E and Owner will review O&M Manuals and Warranties.
- C. The A/E after the review will return a single comment list to the Contractor.

3.10 TRAINING

- A. The lead subcontractor for the respective system is responsible for the development of the training material for the system. The lead subcontractor shall utilize the Operations and Maintenance Manual as a basis for instruction. Any coordination of training between different subcontractors is the responsibility of the lead subcontractor.
- B. The training agendas and material shall be submitted to the A/E and the Owner 30 days prior to the originally scheduled system training for review and acceptance for review. A/E and the Owner shall provide comments to supplement the training material for operations and maintenance personnel where appropriate. Training Agendas shall include:
 - 1. Instructors Name
 - 2. Date of training
 - 3. Duration
 - 4. General purpose of the system
 - 5. Use of the O&M manuals
 - 6. Review of control drawings and schematics
 - 7. Start-up, normal operation, shutdown, unoccupied operation, seasonal changeover, manual operation, controls set-up and programming, troubleshooting, and alarms

8. Interactions with other systems, adjustments and optimizing methods for energy conservation, relevant health and safety issues
 9. Preventative maintenance procedures and schedules. Schedule should be broken out by system and each component requiring maintenance.
 10. Special maintenance and replacement sources
 11. User interaction issues
 12. Discussion of how the feature or system is environmentally responsive
 13. The trainer shall verify that the training agenda is covered and shall obtain signatures and names of persons attending the training.
- C. Owner and A/E will review training agenda and materials.
- D. The A/E after the review will return a single comment list to the Contractor.
- E. All training sessions shall be scheduled and coordinated by the General Contractor through Owner.
- F. Major component training shall be completed and accepted by Owner prior to substantial completion and occupancy.

3.11 CONTROL SYSTEM VERIFICATION:

- A. Included in this work will be sample-based verification of instrument calibration, access to components, labeling of devices, clear sequences and shop drawings.
- B. The verification of the control system will be accomplished as an on-going task during construction to identify and resolve systemic issues early in the project. This on-going task will involve work that occurs offsite and throughout the construction phase including the closeout phase.
- C. The control system operation must be sufficiently operational prior to the TAB of the system. It is understood that a portion of the final control system startup occurs in conjunction with the TAB work. The intent of this requirement is for the TAB work to be productive and not be hampered by a control system that is not sufficiently functional.
- D. The control system testing will utilize the controls system instrumentation for testing. Therefore, the first portion of the control system testing will be verification of the sensors, inputs and outputs.
- E. Point-to-Point Verification: All wiring shall be checked out by the Control Contractor from end to end, point to point, from field to computer screen to ensure correct connection and a system free from wiring defects.
- F. CxA verification of sensors may be made using the sampling method; an exhaustive re-test of the control system inputs and outputs will not be conducted by the CxA. Prior to CxA verification, the Control Contractor shall be responsible for complete input/output checkout quality assurance.
 1. Sensor and Actuator Calibration, General:
 - a. This section is included to emphasize the importance of the Control Contractor calibrating the instrumentation, and to make clear the requirement for same; and that "factory calibration" or "calibration by exception" is not acceptable.
 - b. All field-installed temperature, relative humidity, CO, CO2 and pressure sensors and gages, and all actuators (dampers and valves) on all equipment shall be calibrated using the methods described below. All test instruments shall have had a certified calibration within the last 12 months. Sensors installed in the unit at the factory with calibration certification provided need not be field calibrated.
 - c. All procedures used shall be fully documented on the pre-functional checklists or other suitable forms, clearly referencing the procedures followed and written documentation of initial, intermediate and final results.
 2. Sensor Calibration Methods

- a. All Sensors and Transducers. Verify that all sensor and transducer locations are appropriate and away from causes of erratic operation. Verify that sensors and transducers with shielded cable are grounded only at one end.
- b. Sensors without Transmitters. Make a reading with a calibrated test instrument within 6 inches of the site sensor. Verify that the sensor is within the specified tolerances. If not, install offset in BAS, calibrate or replace sensor.
- c. Sensor Tolerances. The following are the tolerances of the actual sensors in the system. Unless noted differently on the CxA test procedure, use the following:
 - 1) Temperature: +/- 1.0 degF.
- d. Valve and Stroke Setup and Check as follows:
 - 1) For all valve positions checked, verify the actual position against the BAS readout.
 - 2) Set pumps to normal operating mode (If the system could be affected by this, then shut down the system). Command valve closed, visually verify that valve is closed and adjust output zero signal as required. Command valve open, verify position is full open and adjust output signal as required. Command valve to a few intermediate positions. If actual valve position doesn't reasonably correspond, replace actuator.
 - 3) Closure for normally closed valves (spring-loaded only). Disconnect power to the actuator motor, and verify the valve moves to full closed position. If not spring-loaded, conduct verification by disconnecting the signal wire. Restore to normal.
 - 4) Closure for normally open valves (spring-loaded only). Disconnect power to the actuator motor, and verify the valve moves to full open position. If not spring-loaded, conduct verification by disconnecting the signal wire. Restore to normal.

3.12 TEST, ADJUST, AND BALANCE VERIFICATION

- A. The CxA to witness the TAB activities performed by the Contractor/subcontractors to document achievement of the OPR. The specific activities expected include:
 - 1. CxA will review TAB deficiencies report with Owner to evaluate existing conditions and repairs that may be required.
 - 2. Review of TAB procedures during process. TAB Contractor shall verify accessibility of equipment and components required for TAB work, adequate number and placement of duct balancing dampers to allow proper balancing while minimizing sound levels in occupied spaces, adequate number and placement of balancing valves to allow proper balancing and recording of water flow, adequate number and placement of test ports and test instrumentation to allow reading and compilation of system and equipment performance data needed to conduct both tab and commissioning testing.
 - 3. The TAB verification will be done while the system is under automatic control. The control system, VFD's, etc. shall not be manually controlled during verification.

3.13 FUNCTIONAL PERFORMANCE TESTING

- A. The CxA will witness tests performed by the Contractor/subcontractors that are intended to document achievement of the Sequence of Operation (SOO) and OPR. The specific activities expected include:
 - 1. The CxA will provide to all commissioning team members, and others as required, the functional performance test plan prior to scheduled testing.
 - 2. Review of test procedures: the contractor/subcontractors shall review the FPT procedures developed by the CxA. The contractor shall return consolidated comments from all subcontractors within 14 days of receipt from the CxA.

3. FPT's shall be accomplished prior to submitting the initial request for substantial completion and after all construction checklists have been accepted by the CxA and after acceptance of all startup and performance test reports (e.g., TAB report) by the CxA.
 4. Contractor shall assign adequate personnel and tools for the following FPT's and any required retests:
 - a. Plumbing Systems – Review of HVAC equipment plumbing connections (hot water, chilled water, condensate drainage, etc.) in all modes of operation.
 - B. Each subcontractor will be responsible, as required, to assist the CxA by witnessing the testing, putting the system in various modes of operation, and fixing minor problems found during the test.
 - C. Contractor shall be responsible for functional performance testing at the end of construction.
 - D. If major problems are discovered during the test, the responsible subcontractors and General Contractor will fix the problem and the test shall be redone. If more than two functional performance tests are required, the responsible subcontractor will be back-charged for the CxA's time and expenses.
 - E. Control system set-up, calibration and operation shall be completed and verified prior to system Adjusting and Balancing. System functional performance testing shall not be completed until the Adjusting and Balancing report has been verified and accepted by the CxA.
 - F. Skilled technicians shall be provided by the appropriate Contractor familiar with the system and building to execute the functional performance testing of the control system and perform functional performance testing of equipment. The Owner reserves the right to reject any technician who is not qualified to perform the required testing. Qualifications of technicians include site-specific expert knowledge relative to tested equipment and adequate documentation and tools to service and operate the systems.
- 3.14 RECORD DRAWINGS
- A. Contractor shall be responsible for providing the CxA coordinated shop drawing submittals to verify that all trades are coordinating in a reasonable and logical manner.

END OF SECTION

SECTION 02 41 19

SELECTIVE DEMOLITION

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. Demolition and removal of selected portions of building or structure.
 - 2. Demolition and removal of selected site elements.
 - 3. Salvage of existing items to be reused or recycled.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at Project site.
 - 1. Inspect and discuss condition of construction to be selectively demolished.
 - 2. Review structural load limitations of existing structure.

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

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For refrigerant recovery technician.
- B. Engineering Survey: Submit engineering survey of condition of building.
- C. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
- D. Schedule of Selective Demolition Activities: Indicate the following:
 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 3. Coordination for shutoff, capping, and continuation of utility services.
 4. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- E. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations.
- F. 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.
- G. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.7 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

1.8 QUALITY ASSURANCE

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

1.9 FIELD CONDITIONS

- A. Owner may occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. Hazardous materials will be removed by Owner before start of the Work.
 - 2. 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.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.

1.10 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.

1.11 COORDINATION

- A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of Authorities Having Jurisdiction.
- B. Standards: Comply with 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. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
 - 1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
- D. Verify that hazardous materials have been remediated before proceeding with building demolition operations.
- E. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.
 - 1. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.
 - 2. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.2 PREPARATION

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

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
 - 2. Arrange to shut off utilities with utility companies.
 - 3. 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.
 - 4. 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.

3.4 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 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.

3.5 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering, and chopping. Temporarily cover openings to remain.
 - 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.

4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 5. Maintain fire watch during and for at least 8 hours after flame-cutting operations.
 6. Maintain adequate ventilation when using cutting torches.
 7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 10. Dispose of demolished items and materials promptly. Comply with requirements in Division 01 Section "Construction Waste Management and Disposal."
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Removed and Salvaged Items:
1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers.
 3. Store items in a secure area until delivery to Owner.
 4. Transport items to Owner's storage area designated by Owner.
 5. Protect items from damage during transport and storage.
- D. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 3. Protect items from damage during transport and storage.
 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- E. 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.

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.
- B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
- C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.

- D. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings."
- E. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing so that building interior remains watertight and weathertight. See Division 07 Section "Roofing Alterations" for new roofing requirements.
 - 1. Remove existing roof membrane, flashings, copings, and roof accessories.
 - 2. Remove existing roofing system down to substrate.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and recycle or dispose of them according to Division 01 Section "Construction Waste Management and Disposal."
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- 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

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SECTION 03 30 00

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.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture. Submit to Architect for review at least 48 hours before placing concrete.
- C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement.
- D. Steel Reinforcement mill certificates.
- E. Material test reports.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94 requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- B. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
- C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code - Reinforcing Steel."
- D. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 - 1. ACI 301, "Specifications for Structural Concrete."
 - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

- E. Concrete Testing Service: Owner shall engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixture.
- F. Cementitious Material: The concrete supplier shall furnish certification that the cement proposed for use on the project has been manufactured and tested in compliance with the requirements of ASTM C150. The concrete producer shall provide copies of the cementitious material suppliers Certificate of Compliance that represents the materials used by date of shipment for concrete. Cementitious materials without Certification of Compliance shall not be used.
- G. Tests of Reinforcing Bars: Samples shall be taken from bundles as delivered from the mill, with the bundles identified as to heat number and the accompanying mill certificate. One tensile test and one bend test shall be made from a sample from each 10 tons or fraction thereof of each size of reinforcing steel.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: 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.
 - 2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
 - a. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.
- D. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.
- E. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- F. 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.
- G. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706, deformed.
- C. Galvanized Reinforcing Bars: ASTM A 767, Class I zinc coated after fabrication and bending.
- D. Epoxy-Coated Reinforcing Bars: ASTM A 775, epoxy coated, with less than 2 percent damaged coating in each 12-inch bar length.
- E. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.
- F. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.
- G. Galvanized-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from galvanized-steel wire into flat sheets.
- H. 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."
- I. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

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. Supplement with the following if desired:
 - a. Fly Ash: ASTM C 618, Class F.
 - b. Ground Granulated Blast Furnace Slag (GGBFS): ASTM C 989.
 - c. Maximum total percentage of supplementary cementitious materials by mass is 25%.
 - d. See Structural Drawings for water-cement ratios.
- B. Normal-Weight Aggregates: ASTM C 33, graded.
 1. Maximum Coarse-Aggregate Size: See Structural Drawings for maximum aggregate size.
 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Lightweight Aggregate: ASTM C 330.
 1. Maximum Aggregate Size: See Structural Drawings for maximum aggregate size.

2. Aggregates for lightweight concrete mixes shall be expanded clay, slate, or shale. Proportion to produce air-dry concrete unit weight of 110 pounds per cubic foot, determined in accordance with ASTM C 567.

D. Water: ASTM C 94, ASTM C 1602 and potable.

2.4 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. 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. Do not use calcium chloride or admixtures containing calcium chloride. Use admixtures according to manufacturer's written instructions.

1. Water-Reducing Admixture: ASTM C 494, Type A.
2. Retarding Admixture: ASTM C 494, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017, Type II.

2.5 CURING MATERIALS

A. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.

B. Absorptive Cover/ Moisture Retaining Curing Cover: 55-mils thick, spunlace viscous fibers with super absorbent polymer mat with polyethylene sheet backing. 90% reflectance in accordance with ASTM E 1447 and water retention moisture loss of 0.0062 oz/sq in (2.7 g/sq m) in accordance with ASTM C 156 as manufactured by Reliable Concrete Accessories.

C. Wet Curing: 7-day cure. Do not use sheet membrane (ASTM C171) polyethylene film.

2.6 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1752, Type I or ASTM D8139, 3/8-inch thick and full depth of concrete, with a separate or pre-scored, removable top section for creation of a sealant void. Nomaflex by Nomaco, Inc., semi-rigid, closed-cell polypropylene foam, preformed joint filler.

B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

2.7 CONCRETE MIXTURES

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
 - B. Admixtures: Use admixtures according to manufacturer's written instructions.
 1. Use water-reducing in concrete, as required, for placement and workability.
 - C. Proportion concrete mixtures as shown on the Structural Drawings.
- 2.8 CONCRETE MIXING
- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94 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.

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.
- C. Construct forms tight enough to prevent loss of concrete mortar.
- D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 1. Install keyways, reglets, recesses, and the like, for easy removal.
 2. Do not use rust-stained steel form-facing material.
- E. 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.
- F. Where vertical concrete surfaces of footings will be below finished grade, clean cut earth may be used in lieu of form if the character of the soil will permit installation of reinforcing and placement of concrete without sloughing, and, concrete dimension 1-inch at each face poured against earth.
- G. Chamfer exterior corners and edges of permanently exposed concrete, unless otherwise noted.
- H. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

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- I. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- J. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- K. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.
- L. Forms shall be kept wet to prevent opening of joints that would permit loss of concrete mortar and fines.
- M. Forms may be re-used provided that they are thoroughly cleaned and reconditioned as necessary to produce results equal to those achieved by the use of new forms.

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.

3.3 REMOVING 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 for 48 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.
 - 1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 75 percent of its 28-day design compressive strength.
- B. Upon removal of forms, all ties, bolts, wires, clamps, and other metal not necessary to subsequent work shall be removed to a minimum of 1-inch below the surface.
- C. Whenever the formwork is removed during the curing period, the exposed concrete shall be cured as specified hereinafter.

3.4 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
 - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

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1. Weld reinforcing bars according to AWS D1.4, where indicated.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.
- F. All concrete shall be steel reinforced unless specifically noted to be “not reinforced”. If no reinforcement is shown, reinforce in the same manner as that shown in similar places.

3.5 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
- C. Waterstops at all below grade construction joints shall be made of virgin polyvinyl chloride compound and shall conform to the requirements of the Corps of Engineers Specification CRD-C572. Waterstops shall be produced by an extrusion process and shall be uniform in dimension, homogenous and free from porosity. Unless otherwise shown, use waterstops of 6-inch minimum width and 3/8-inch minimum thickness.

Waterstop construction shall include:

1. Construction Joints: Serrated type with center bulb
- D. 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. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Saw cut slab as soon as possible after the slab pour and prior to slab cooling (typically 4 hours in hot weather and 12 hours in cold weather). A test cut shall be made to ensure to ensure raveling of the cut edges does not occur.
 2. Sawed Joints made with early entry saw: Form contraction joints with early entry saws equipped with shatterproof abrasive or diamond-rimmed blades. Saw cut slab as soon as the slab can support the equipment and operator without leaving indentations (typically 1 hour in hot weather and 4 hours in cold weather). The saw manufacturer’s guidelines and recommendations shall be followed.
 3. Slab Inserts: Form contraction joints with plastic or metal control joint inserts. This method may not be used at slabs exposed to view.
- E. 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.

3.6 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. 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. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
- C. Cold-Weather Placement: Comply with ACI 306.1.
- D. Hot-Weather Placement: Comply with ACI 301.

3.7 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 exposed to public view, unless otherwise noted.
- 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 exposed to public view and to surfaces 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.
- D. Exposed surfaces shall have edges and both sides of joints tooled to 1/4-inch radius unless noted otherwise.

3.8 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in one direction.
 - 1. Apply scratch finish to surfaces indicated.

- C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
 - 1. Apply float finish to surfaces indicated.
- D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 - 1. Apply a trowel finish to interior slab surfaces, unless otherwise noted.
- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated. While concrete is still plastic, slightly scarify surface with a fine broom.
- F. Broom Finish: Apply a broom finish to exterior concrete slabs, steps, ramps, and elsewhere as indicated, unless otherwise noted.
- G. Non-Slip Broom Finish: Apply non-slip broom finish to exterior concrete platforms, steps and ramps, and elsewhere as indicated.
 - 1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.
- H. Finish for Exposed Concrete Along Accessible Routes of Travel: When measured by the NBS-Brungraber machine using a silastic sensor shoe, slopes less than, or equal to 6 percent slope shall have a Static Coefficient of Friction of 0.6 minimum with "Medium Broom Finish" or equivalent slip resistant finish; and slopes greater than 6 percent slope shall have a Static Coefficient of Friction of 0.8 minimum with "Heavy Broom Finish" or equivalent slip resistant finish.
- I. Surfaces: Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch at interior slab surfaces and 1/4 inch at exterior slab surfaces.

3.9 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 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. 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 with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
 - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
 - c. 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.

3.10 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

3.11 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified testing agency to perform field tests and prepare test reports.
 1. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
 - a. Testing Frequency: Obtain at least one composite sample for each 50 cu. yd. or fraction thereof or not less than once for each 2000 square feet of surface area for slabs and walls for each concrete mixture placed each day.
 - b. Slump: ASTM C 143; one test at point of placement for each composite sample at every fourth truck, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.

- c. Compression Test Specimens: ASTM C 31; cast and laboratory cure four standard cylinder specimens for each composite sample.
 - d. Compressive-Strength Tests: ASTM C 39; test one laboratory-cured specimen at 7 days, and two specimens (6-inch x 12-inch) or three specimens (4-inch x 8-inch) at 28 days. Hold the remaining specimen for future testing if so directed by Architect.
 - e. 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.
 - f. 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 7-day and 28-day tests.
 - g. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, 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 or by other methods as directed by Architect.
 - h. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- B. Concrete Preplacement and Placement Inspections: Owner will engage a qualified inspecting agency to perform field inspections and prepare inspection reports.
- 1. Concrete Preplacement Inspections:
 - a. Placement of reinforcing steel before forms are closed.
 - b. Bolts to be installed in concrete prior to placement of concrete.
 - c. Formwork shape, location, and dimensions of concrete member being formed.
 - d. All preparations for the placement have been completed, and the preparations have been checked by the inspector of record.
 - 2. Concrete Placement Inspections:
 - a. Concrete placement for proper application techniques.
 - b. Maintenance of specified curing procedure.
 - c. Placing record: A record shall be kept on the 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 DSA.
- C. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

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SECTION 05 12 00

STRUCTURAL STEEL FRAMING

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 structural steel and grout.

1.3 DEFINITIONS

- A. Structural Steel: Elements of structural-steel frame, as classified by AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication of structural-steel components.
 - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 - 2. Include embedment drawings.
 - 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
 - 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.
- C. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide according to AWS D1.1, "Structural Welding Code - Steel," for each welded joint whether prequalified or qualified by testing.
- D. Qualification Data: For qualified fabricator.
- E. Welding certificates.
- F. Mill test reports for structural steel, including chemical and physical properties.

1.5 QUALITY ASSURANCE

- A. Fabricator's Qualifications: Fabricator must have 5 years of experience in fabricating structural steel similar to the size and difficulty of this project.
- B. Erector's Qualifications: Erector must have 5 years of experience in erecting structural steel similar to the size and difficulty of this project.

- C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code - Steel."
- D. Comply with applicable provisions of the following specifications and documents:
 - 1. AISC 303.
 - 2. AISC 341 and AISC 341s1.
 - 3. AISC 360.
 - 4. RCSC's "Specification for Structural Joints Using High-Strength Bolts."
 - 5. California Building Code Chapter 22A.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
 - 1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
- B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
 - 1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
 - 2. Clean and relubricate bolts and nuts that become dry or rusty before use.
 - 3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

1.7 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

- A. W-Shapes: ASTM A 992, unless noted otherwise.
- B. Channels and Angles: ASTM A 36, unless noted otherwise.
- C. Plate and Bar: ASTM A 36, unless noted otherwise.
- D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing, unless noted otherwise.

STRUCTURAL STEEL FRAMING 05 12 00 - 2

E. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B, unless noted otherwise.

F. Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts, Nuts, and Washers: ASTM F3125, Gr A325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers; all with plain finish.

B. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1, Type B.

C. Unheaded Anchor Rods: ASTM F 1554, Grade 36, unless otherwise noted.

1. Finish: Plain, unless otherwise noted. Hot-dip zinc coating, ASTM A 153, Class C when "Galvanized" specified on Drawings.

D. Headed Anchor Rods: ASTM F 1554, Grade 36, straight, unless otherwise noted.

1. Finish: Plain, unless otherwise noted. Hot-dip zinc coating, ASTM A 153, Class C when "Galvanized" specified on Drawings.

E. Threaded Rods: ASTM F 1554, Grade 36, unless otherwise noted.

1. Finish: Plain, unless otherwise noted. Hot-dip zinc coating, ASTM A 153, Class C when "Galvanized" specified on Drawings.

F. Clevises and Turnbuckles: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1035.

2.3 PRIMER

A. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

2.4 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC 360.

B. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1 and manufacturer's written instructions.

- C. Finishing: At exposed connections, finish exposed welds and surfaces smooth and blended.

2.6 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using High-Strength Bolts" for type of bolt and type of joint specified.
- B. Weld Connections: Comply with AWS D1.1 for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

2.7 SHOP PRIMING

- A. Shop prime steel surfaces except the following:
 - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
 - 2. Surfaces to be field welded.
 - 3. Surfaces to be high-strength bolted with slip-critical connections.
 - 4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
 - 5. Galvanized surfaces.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
 - 1. SSPC-SP 2, "Hand Tool Cleaning."
 - 2. SSPC-SP 3, "Power Tool Cleaning."
- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

2.8 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123 to all steel exposed to weather and all steel indicated on the Drawings.

2.9 SOURCE QUALITY CONTROL

- A. Testing Agency: Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.
 - 1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
- B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.
- C. Bolted Connections: Shop-bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using High-Strength Bolts."

- D. Welded Connections: Shop-welded connections will be inspected according to AWS D1.1. Additionally, all complete penetration welds shall have Ultrasonic Inspection, ASTM E 164.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify, with steel Erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
- B. Base Bearing and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
 - 1. Set plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Weld plate washers to top of base plate.
 - 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 - 4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 1. Level and plumb individual members of structure.
 - 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- E. Splice members only where indicated.
- F. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.
- G. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1 and manufacturer's written instructions.

3.3 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using High-Strength Bolts" for type of bolt and type of joint specified.
- B. Weld Connections: Comply with AWS D1.1 and AWS D1.8 for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 - 1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
 - 2. Remove backing bars or runoff tabs where indicated, back gouge, and grind steel smooth.
 - 3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.
- B. Bolted Connections: Bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using High-Strength Bolts."
- C. Welded Connections: All field-welded connections will be inspected according to AWS D1.1. Additionally, all complete penetration welds shall have Ultrasonic Inspection, ASTM E 164.
- D. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

3.5 REPAIRS AND PROTECTION

- A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780.
- B. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

END OF SECTION

SECTION 09 91 13

EXTERIOR PAINTING

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 surface preparation and the application of paint systems on exterior substrates. Provide finish painting of all exposed exterior surfaces, except bright metal, glass, integral-colored materials, concrete floors, pavements, and surfaces noted to be unpainted. Touch-up factory paint finishes as required. Areas or items not specifically mentioned and requiring paint shall be painted similar to specified areas or items. This Section includes surface preparation and the application of paint systems on exterior substrates:
- B. Related Sections include the following:
 - 1. Division 01 Section "CALGreen Requirements".
 - 2. Division 05 Section "Structural Steel Framing".

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
 - 1. Submit Samples on rigid backing, 8 inches square.
 - 2. Label each Sample for location and application area.
- C. 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. Printout of current Manufacturer's Material Safety Data Sheets (MSDS) for each product category specified in Part 2, with the proposed product highlighted.

1.4 REFERENCE STANDARDS

- A. Manufacturer's written recommendations and standards; and Master Painters Institute (MPI) Standards.
 - 1. Preparation and Workmanship: Comply with requirements in reference standards above for products and application of paint systems indicated.

1.5 DELIVERY STORAGE AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.6 PROJECT CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.
 - 1. Quantity: Furnish 5 gallons of each applied color and finish, and 5 gallons of Anti-Graffiti Coating.

1.8 GLOSS LEVEL DEFINITIONS

- A. Gloss Level 1, Drawing Mark FL: A traditional matte finish – flat. Maximum of 5 units gloss at 60 degrees. Maximum of 10 units sheen at 85 degrees.
- B. Gloss Level 2, Drawing Mark SF: A high side sheen flat – a “velvet like” finish. Maximum of 10 units gloss at 60 degrees. 10 - 35 units sheen at 85 degrees.
- C. Gloss Level 3, Drawing Mark ES: A traditional “eggshell like” finish. 10 - 25 units gloss at 60 degrees. 10 – 35 units sheen at 85 degrees.
- D. Gloss Level 4, Drawing Mark SA: A “satin like” finish. 25 - 30 units gloss at 60 degrees. Minimum of 35 units sheen at 85 degrees.
- E. Gloss Level 5, Drawing Mark SG: A traditional semigloss. 35 - 70 units gloss at 60 degrees.
- F. Gloss Level 6, Drawing Mark G: A traditional gloss. 70 - 85 units gloss at 60 degrees.
- G. Gloss Level 7, Drawing Mark HG: A traditional high gloss. More than 85 units gloss at 60 degrees.

PART 2 - PRODUCTS

2.1 PRODUCTS

- A. Basis-of-Design Products: All paint products shall be from same manufacturer. Subject to compliance with requirements provide Sherwin Williams (David DeSantis (415) 310-5896 david.d.desantis@sherwin.com) products specified or approved equal products from following manufacturers:

1. Benjamin Moore.
2. Dunn Edwards.

B. Colors and Gloss Levels: As selected by Architect from manufacturer's full range.

2.2 PAINT, GENERAL

A. Material Compatibility:

1. 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.
2. 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. Colors and Gloss Levels: As indicated on Drawings.

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. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- C. Proceed with coating application only after unsatisfactory conditions have been corrected.
 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 1. After completing painting operations, workers skilled in the trades were involved in reinstalling 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 re-prime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturers but not less than the following:

1. SSPC-SP 2, "Hand Tool Cleaning."
 2. SSPC-SP 3, "Power Tool Cleaning."
 3. SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
 4. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."
- E. 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.
- F. 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.
- G. Aluminum and Stainless-Steel Substrates: Remove surface oxidation, oil, grease, and soap film, and clean with neutral detergent or emulsion cleaner. Treat with alodine 1200, Alumiprep or comparable product, or blast lightly with fine abrasive or acid etch.
- H. Structural Steel: Comply with applicable requirements above and the following:
1. Grind smooth all sharp edges and rough areas that will hinder the application of a pinhole-free coating prior to the application of any coating.
 2. Prepare surfaces by dry abrasive blasting to SSPC SP-10 (near-white). Remove all shop applied primers or other coatings that do not comply with the specified primers and coatings.
 3. Stripe coat all edges, corners, welds, and bolts prior to application of additional system coats.
 4. Perform continuity and pinhole checks by means of electrical resistance meters and perform thickness checks with magnetic thickness gauges. Perform checks in accordance with applicable SSPC standards
- I. APPLICATION
1. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."
 2. Use applicators and techniques suited for painting and substrate indicated.
 3. Paint surfaces behind movable items are the same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
 4. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
 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.
- J. Tint undercoats are the 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.
- K. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

- L. 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.

3.3 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 - 1. Contractors shall touch up and restore painted surfaces damaged by testing.
 - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.4 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in undamaged condition.
 - 1. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 EXTERIOR PAINTING SCHEDULE

- A. Metal Substrates Ferrous Metals: (Gloss)
 - 1. Surface Preparation by Steel Fabricator: Commercial Blast SSPC- SP6.
 - 2. 1st Coat: Primer – Sherwin Williams, B69A00100, Zinc Clad III HS Organic Zinc-Rich Epoxy Primer.
 - 3. 2nd Coat: Intermediate Coating – Sherwin Williams, B58W006100, Micropoxy 646 Fast Cure Epoxy.
 - 4. 3rd Coat: Topcoat – Sherwin Williams, B65WJ0311, Hi-Solids Polyurethane Gloss-CA.
- B. Metal Substrates Galvanized Metals: (Gloss)
 - 1. Surface Preparation by Steel Fabricator: Brush-Off Blasted SSPC-SP 16.
 - 2. 1st Coat: Primer – Sherwin Williams, B58W006100, Micropoxy 646 Fast Cure Epoxy.
 - 3. 2nd Coat: Topcoat – Sherwin Williams, B65WJ0311, Hi-Solids Polyurethane Gloss-CA.
- C. Exterior Galvanized Sheet Metal: (Gloss)
 - 1. Surface Prep by Painter: SSPC-SP 1 Solvent Clean.
 - 2. 1st Coat: Primer - Sherwin Williams, B71Y00001, DTM Wash Primer.

3. 2nd Coat: Topcoat – Sherwin Williams, B65WJ0311, Hi-Solids Polyurethane Gloss-CA.

END OF SECTION

SECTION 22 00 00

PLUMBING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. The Contractor's attention is directed to the General and Special Conditions, and to all other Contract Documents as they apply to this branch of the work. Attention is also directed to all other sections of the Contract Documents which affect the work of this section, and which are hereby made a part of the work specified in this section.

1.2 SCOPE

- A. Unless otherwise indicated, all materials shall be new and of the best grade and quality for the specified type.
- B. The piping indicated shall be installed complete and shall be of the size indicated. When the pipe size is not indicated, the Contractor shall request the pipe size from the Engineer. Where a section of piping is not indicated but is obviously required for completion of the system, the Contractor shall provide same at no additional cost to the project.
- C. Piping materials in each system shall, to the extent practicable, be of the same material. Frequent changes of material (for example, from copper to steel) shall be avoided and in no case shall be accomplished without use of insulating unions and permission of the Engineers.

1.3 CODES, REGULATIONS, AND STANDARDS

- A. All industrial cold water and natural gas piping systems shall conform to the following codes, regulations and standards:
 - 1. Steel pipe, ASTM A-53.
 - 2. Copper pipe, ASTM B88-62
 - 3. Cast iron screwed fittings, ASA B16.4.
 - 4. Cast brass and wrought copper fittings; ASA B16.18.
 - 5. Cast brass drainage fittings; ASA B16.23.
 - 6. The 2022 California Code of Regulations, Title 24
 - 7. Part 5 California Plumbing Code 2022
 - 8. NFPA 54-99, National Fuel Gas Code
 - 9. ANSI B31.2, Fuel-Gas Piping.
 - 10. PG&E requirements for gas piping.

1.4 SUBMITTALS

- A. Product Data: For pipe, tube, fittings, valves, couplings, meters, pressure regulators, and strainers.

PART 2 – PRODUCTS

2.1 INDUSTRIAL COLD WATER PIPING (ABOVE GRADE)

- A. Type "L" hard copper tubing with wrought copper fittings with lead free solder equivalent in performance to 95/5. (Maximum lead content of solder and flux is 2%).

2.2 UNIONS

- A. Screwed or soldered unions shall be provided as required to permit removal of equipment, valves and piping accessories from the piping system.
- B. Dielectric insulating couplings shall be used wherever the adjoining materials being connected are of dissimilar metals such as connections between copper and steel pipe.

2.3 NATURAL GAS PIPING (ABOVE GRADE)

- A. Above Grade Exterior Piping: Piping ASTM A106 Grade B, Schedule 40, carbon steel pipe, hot dipped galvanized coating.
- B. Fittings:
 - 1. Pipe sizes 2" and smaller: Schedule 40, black steel pipe; malleable iron threaded fittings with hot dipped galvanized coating.
 - 2. Pipe sizes 2-1/2" and larger: Schedule 40, black steel pipe; wrought-steel butt welded fittings.
- C. Ball Valves (1/2" to 2" size): Bronze ball valve with B16 chrome plated brass ball and threaded ends; vinyl-coated steel handle; factory-tested under water with air pressure in open and closed positions. Listed by UL as natural gas shut-off valve and labeled accordingly.

2.4 BACKFLOW PREVENTERS

- A. Reduced Pressure Backflow Preventers:
 - 1. Manufacturers: Watts, Zurn, Wilkins or equal.
 - 2. Standard: ASSE 1013.
 - 3. Operation: Continuous-pressure applications.
 - 4. Pressure Loss: 12 psig maximum, through middle third of flow range.
 - 5. Body: Bronze for NPS 2 and smaller.
 - 6. End Connections: Threaded end connections for NPS 2 and smaller.
 - 7. Designed for horizontal, straight-through flow.
 - 8. Valves NPS 2 and Smaller: Ball type with threaded ends on inlet and outlet.

2.5 WATER PRESSURE-REDUCING VALVES

- A. Water Regulators:
 - 1. Manufacturers: Watts, Wilkins, Zurn or equal.
 - 2. Standard: ASSE 1003.
 - 3. Pressure Rating: Initial working pressure of 150 psig.
 - 4. Brass or Bronze body for NPS 2 and smaller
 - 5. Threaded end connections for NPS 2.
 - 6. Cabinet: Factory fabricated, stainless steel, for surface mounting and with hinged, stainless-steel door.

2.6 STRAINERS

A. Y-Pattern Strainers:

1. Pressure Rating: 125 psig.
2. Bronze body for NPS 2 and smaller.
3. Threaded end connections for NPS 2 and smaller.
4. Stainless steel screen with round perforations, 0.033 inch.
5. Pipe plug drain.

2.7 HOSE BIBBS

A. Hose Bibbs: Woodford, Acorn or equal.

1. Bronze body and seat.
2. Supply Connections: NPS 3/4 threaded or solder-joint inlet.
3. Garden-hose thread complying with ASME B1.20.7.
4. Pressure Rating: 125 psig (860 kPa).
5. Rough bronze finish.
6. Operating key.

PART 3 – EXECUTION

- 3.1 Dielectric couplings shall be provided at all connections of dissimilar materials.
- 3.2 Nipples shall be of the same material and weight classification as pipe with which installed.
- 3.3 Install all gas piping per NFPA54.
- 3.4 All piping shall be capped or plugged during construction as required to keep clean and debris and moisture free.
- 3.5 All piping shall be installed straight and true, parallel or perpendicular to the building construction. Piping shall be installed to allow for expansion without damage to the building finishes, structure, pipe, equipment, etc. Use offsets, U-bends or expansion joints as required.
- 3.6 All pipes shall be supported in a neat and workmanlike manner and wherever possible, parallel runs of horizontal piping shall be grouped together on hangers.
- 3.7 Spacing of pipe supports shall not exceed six (6) foot intervals for pipes between 1-1/2" and 3". Pipes 1" and smaller shall be bracketed to walls, structural members, etc. at four (4) foot intervals.
- 3.8 Where piping rests directly on a hanger, clip, bracket or other means of support, the support element shall be of the same material as the pipe, (e.g., copper to copper, ferrous to ferrous, etc.) or shall be electrically isolated one from the other to prevent pipe damage by electrolysis.
- 3.9 Installation of pipe shall be in such a manner as to provide complete drainage of cold water systems. Drain valves shall be provided at all drainage points on pipes. Drain valves shall be 1/2" size ball valves with 3/4" hose thread end and vacuum breaker. Label each drain valve.

- 3.10 Install backflow preventers in each water supply to mechanical equipment and systems and to other equipment and water systems that may be sources of contamination. Comply with authorities having jurisdiction.
- A. Install water regulators with inlet and outlet shutoff valves. Install pressure gages on inlet and outlet.
 - B. Install Y-pattern strainers for water on supply side of each water pressure-reducing valve.
- 3.11 PIPE TESTING
- A. Water piping systems shall be subjected to a hydrostatic test of 150 psi. The system shall be proven tight after a twenty-four (24) hour test.
 - B. Natural gas piping downstream of the meter assembly shall be leak tested in accordance with the following:
 - 1. Low Pressure (up to 14" wc) – Test to 10 psi for 24 hours.
 - 2. Elevated Pressure (up to 2 psi) – Test to 50 psi for 24 hours.

END OF SECTION

SECTION 23 00 00

BASIC HVAC REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to the work of this Section as fully as if repeated here.
- B. This Section and the following Sections apply to all work of Division 23.
 - 1. Section 23 05 00, "Common Work Results for HVAC."
 - 2. Section 23 05 13, "Common Motor Requirements for HVAC Equipment."
 - 3. Section 23 05 19, "Meters and Gauges for HVAC Piping."
 - 4. Section 23 05 23, "General Duty Valves for HVAC."
 - 5. Section 23 05 29, "Supports, Hangers, Anchors and Sleeves."
 - 6. Section 23 05 48, "Vibration and Seismic Controls for HVAC Piping and Equipment."
 - 7. Section 23 05 53, "Identification for HVAC Piping and Equipment."
 - 8. Section 23 07 00, "Testing, Adjusting, and Balancing."
- C. Coordinate with the work of the Commissioning Agent. Comply with the requirements of Section 23 08 00, "HVAC Commissioning Requirements."

1.2 SUMMARY

- A. Furnish all labor, materials, tools, equipment, and services for all mechanical work as specified in the Contract Documents, shown in the drawings, and required to complete the work. Coordinate Division 23 work with the work of all other trades.
- B. Drawings, Use and Interpretation:
 - 1. Drawings are diagrammatic and indicate the general arrangement of systems and equipment, except when specifically dimensioned or detailed.
 - 2. Refer to dimensioned architectural and structural drawings for the exact locations of building elements.
 - 3. Field measurements take precedence over dimensioned drawings.
 - 4. Piping plans are intended to show the size, capacity, approximate location, direction, and general relationship of the work.
 - 5. The most stringent requirement shall apply to any conflict in the drawings or specifications. Bring conflicts to the attention of the Owner's Representative for resolution before construction.
- C. The plans, schematics, and diagrams indicate the general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, thermal expansion, pump sizing, and other design considerations. Install piping as indicated on the drawings unless deviations are approved by the Engineer-of-Record.

1.3 WORK SPECIFIED UNDER OTHER DIVISIONS

- A. See Division 3, “Concrete” for housekeeping pads and curbs for mechanical equipment.
- B. See Division 9, “Finishes” for finish painting unless specified otherwise.
- C. See Division 26, “Electrical” for motor controls and power wiring.

1.4 QUALITY ASSURANCE

- A. Perform all work in accordance with the following codes, regulations, and standards:
 - 1. Codes:
 - a. 2022 California Building Code, CBC
 - b. 2022 California Fire Code, CFC
 - c. 2022 California Electric Code, CEC
 - d. 2022 California Plumbing Code, CPC
 - e. 2022 California Mechanical Code, CMC
 - f. California Occupational Safety Health Act, OSHA
 - g. California Code of Regulations, CCR
 - h. CCR Title 24 2019, California Energy Code, CEC
 - i. Applicable Local Codes and Ordinances
 - 2. Regulations:
 - a. California State Fire Marshal, CSFM
 - b. California State Department of Public Health, CSDPH
 - c. Safety Orders of the Division of Industrial Safety, SODIS
 - d. Bay Area Air Quality Management District, BAAQMD
 - e. City of Antioch Fire Department
 - 3. Standards:
 - a. Air Conditioning, Heating, and Refrigeration Institute, AHRI
 - b. Air Movement and Control Association, Inc., AMCA
 - c. American Gas Association, AGA
 - d. American National Standards Institute, ANSI
 - e. American Society of Heating, Refrigeration, and Air Conditioning Engineers, ASHRAE
 - f. American Society of Mechanical Engineers, ASME
 - g. American Society of Plumbing Engineers, ASPE
 - h. American Society of Testing and Materials, ASTM
 - i. American Water Works Association, AWWA
 - j. American Welding Society, AWS
 - k. Associated Air Balance Council, AABC
 - l. Factory Mutual, FM
 - m. International Association of Plumbing and Mechanical Officials, IAPMO
 - n. Institute of Boiler and Radiator Manufacturers, IBR
 - o. Manufacturer’s Standardization Society of the Valves and Fittings Industry, MSS
 - p. National Electrical Manufacturers Association, NEMA
 - q. National Environment Balancing Bureau, NEBB
 - r. National Fire Protection Association NFPA
 - s. Plumbing and Piping Industry Council, PPIC
 - t. Sheet Metal and Air Conditioning Contractors National Association, Inc., SMACNA

- u. Underwriters' Laboratories, UL
- 4. Nothing in the drawings or specifications is to be interpreted as permitting work that does not conform to the codes, regulations, and standards.
- 5. Should there be any direct conflict between the codes, regulations and standards and the provisions of the Contract Documents, the codes, regulations and standards shall govern.
- 6. Where standards of drawings and specifications for materials and/or workmanship are higher than those of applicable codes, regulations and standards, the drawings and specifications shall take precedence.

B. Certifications: Provide Proof of Code Compliance for equipment as follows:

- 1. Gas Fired Equipment and Safety Devices: Per applicable standards and bear the label of AGA.
 - a. Fuel-burning heating appliances shall bear a permanent and legible factory-applied nameplate on which shall appear the manufacturer's name, approved fuel input rating, expressed in Btu/hr., model and serial numbers, instructions for lighting, operation, and shutdown, type fuel approved for use, and symbol of approved agency certifying compliance of equipment with recognized standards.
- 2. Electrical Equipment and Safety Devices: Per applicable standards of the NEC, UL, or ETL.
- 3. Pressure vessels and pressure safety devices shall bear an ASME board certification label.
- 4. Energy Conservation: Comply with applicable codes. Provide equipment and materials certified by the manufacturer in accordance with the California Energy Code.
- 5. Provide UL-listed equipment where required by the authority having jurisdiction.

C. Repair or replace, to the Owner's satisfaction, any damage to work of this Section and damage caused by the work of this Section.

D. Workmanship shall be of the highest quality throughout and performed only by competent and experienced workmen in a manner satisfactory to the Owner. Constant work supervision shall be maintained by the contractor or their representative.

E. Use only new materials in perfect condition. Inspect all materials upon arrival at the job site and immediately remove defective items.

1.5 DEFINITIONS

- A. "Piping" includes, in addition to pipe, all fittings, flanges, valves, hangers and other accessories related to such piping.
- B. "Wiring" includes, in addition to conductors, all raceway, conduit, fittings, boxes, switches, hangers, and other accessories related to such wiring.
- C. "Concealed" means hidden from sight or embedded in the construction.
- D. "Exposed" means not installed underground or "concealed" as defined above.
- E. "Provide" means to furnish and install.

1.6 SUBMITTALS

A. General:

1. Comply with the requirements of the General Conditions and the specific requirements of Division 23.
2. submit all similar equipment together as part of the same submittal.
3. The contractor shall review all submittals prepared by each supplier and mark all copies as acceptable to the contractor. The contractor's acceptance shall signify that all required service connections are shown in the proper location to meet the installation requirements and that the equipment can fit in the space allowed.
4. Do not order equipment until submittals have been reviewed and approved by the Architect/Engineer.
5. Each submitted item shall be labeled or identified as shown on the drawings.
6. Mark submittal "Exactly as Specified" or accompanied by a letter from the supplier explaining in detail what difference, if any, exists between the submitted item and the specified item. Failure to point out the differences will be considered cause for disapproval. The Architect/Engineer will not assume responsibility for differences not brought to their attention, and the contractor will be required to correct any deficiencies or differences discovered at a later date, and assume responsibility for any delays, damage, and/or expenses incurred by others due to such action.
7. Do not use substitute materials unless approved in writing by the Architect/Engineer. Approval of substitute material does not relieve the contractor of responsibility for providing a workable and functioning system as specified.
8. Submittals will be checked for general conformance with the design concept, but acceptance by the Architect/Engineer in no manner is meant to verify that dimensions, quantities, or location of services are as necessary to meet the job requirements. This remains the responsibility of the contractor.

B. Shop Drawings:

1. General: Prepare and submit shop drawings, plans, sections, details and diagrams at the required scales for the project area.
2. Required Drawings: Prepare and submit drawings for all areas and all mechanical work, unless specifically excluded below under deviation drawings. Scale shall be minimum 1/4" = 1'0" (1:30) in mechanical rooms, utility yards, and other areas with mechanical work.

C. Product Data:

1. General: Manufacturer's specifications, data sheets, certified drawings, and installation instructions. Include physical and performance data such as weights, sizes, capacities, required clearances, performance curves, acoustical characteristics, finishes, color selection, location and size of field connections, and accessories. Include certified drawings on major equipment such as boilers, water chillers, pumps, tanks, and controls.
2. Motors: Submit manufacturer's name, type, RPM, HP (KW), full load amps, efficiency, and power factor.
3. Part Load Performance: Submit data to indicate the performance characteristics of equipment throughout the full range of capability.
4. Include operating weight and location of center of gravity of each item of equipment in the manufacturer's cut sheet for the purpose of seismic calculation.

D. Test Reports

1. Manufacturer's Tests:
 - a. Factory Tests: As specified for specific equipment.
 - b. Field Tests: As specified.
2. System Pressure Tests: Provide the test log of pressure tests on each system tested. Indicate the test date, scope of the test, test pressure, duration, recording of measurements, and observers.
3. Balancing Reports: As specified in Section 23 05 93, "Testing, Adjusting, and Balancing."

E. Certification:

1. Seismic Restraints: As specified in Section 23 05 29, "Supports, Hangers, Anchors, and Sleeves for HVAC."
2. Fire and Life Safety Systems and Equipment: Before a request for the Architect's review and before occupancy, fire, and life safety systems and equipment have been properly installed, are completely operational, and comply with Contract Documents, applicable code requirements, and requirements of code enforcing authorities.
3. Controls: As specified under Section 23 09 00, "Instrumentation and Control for HVAC."

F. Operating and Maintenance Manuals: Include, but not limited to, the following:

1. List of all equipment with manufacturer's name, model number, local representative, service facilities, and normal channel of supply for each item. Include the phone numbers, email addresses, and street addresses of representative's office and service facilities.
2. System Description: Description of start-up, operating, and shutdown procedures.
3. Controls: Diagrams and descriptions of operating sequences for each system.
4. Equipment: Manufacturer's brochures, ratings, certified shop drawings, lubrication charts, and data, parts lists with part numbers, and belt and sheave data. Mark each sheet with the equipment identification number and actual installed condition.
5. Materials and Accessories: Manufacturer's brochures parts list with part numbers and lubrication data where applicable. Mark each sheet with the equipment identification number or system and installation location.
6. Identify which options are provided in case the data sheet shows multiple options.
7. Certificate of factory tests, field tests, and code compliance as specified.
8. Wiring and controls schematics.
9. Troubleshooting directions.
10. Maintenance procedures and frequencies.
11. Description of special tools.
12. Copies of warranties.
13. Safety precautions.
14. Emergency contingencies.

G. Record Documents:

1. Comply with the requirements of Division 1.
2. Indicate sizes and locations of all equipment including control devices, filters, and devices requiring maintenance or repair.

3. Indicate mains and branches of piping system, with valves and control devices located and numbered per valve schedule, and with items requiring maintenance located (i.e., strainers, expansion compensators, vents, etc.).
 4. Identify approved substitutions, contract modifications, and actual equipment and materials installed.
- H. VOC Data: Submit product data and Material Safety Data Sheets (MSDS) for adhesives and sealants applied on-site to meet the Volatile Organic Compound (VOC) requirements under Part 2 Products. If MSDS sheets are not available, provide cut sheets, brochures, or testimonial letters from manufacturers.

1.7 SUBSTITUTIONS

A. General:

1. The manufacturer upon which the design is based is listed in the equipment schedules.
 2. Additional acceptable manufacturers are indicated in the Division 23 specifications.
 3. Other manufacturers, materials, or methods shall not be used unless approved in writing by the Architect/Engineer.
 4. The burden of proof as to the equality of any proposed substitute manufacturer, material, or method shall be upon the contractor.
 5. The Architect's/Engineer's decision about the acceptability of substitutions shall be final.
- B. Requests for substitution review and acceptance shall be accomplished by comparison tables listing pertinent features of both specified and proposed materials, such as materials of construction, performance, dimensions, weights, replacement or maintenance access, motor type, horsepower, voltage, phase, service factor. Review of proposed substitutions will not be made until receipt of satisfactory comparison tabulation.
- C. Submittal of substitutions shall be limited to one proposal for each type of item unless otherwise permitted by the Architect. If the first proposed product submittal is rejected, the contractor shall submit the first-named or scheduled product.

1.8 JOB CONDITIONS

- A. Examine contract documents to determine how other work will affect the execution of mechanical work.
- B. Establish lines and levels for each system and coordinate with other systems to prevent conflicts and maintain proper clearances and accessibility.

1.9 PRODUCTS, STORAGE AND HANDLING

- A. Refer to Division 1.
- B. Piping: Cap openings against entry by foreign matter.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Materials for Mechanical Work: Use only prime quality, new materials, apparatus, and equipment.

2.2 MATERIALS AND EQUIPMENT

- A. General:
 - 1. Standard products of manufacturer specified.
 - 2. Where more than one unit is required of any item, furnish by the same manufacturer, except where specified otherwise.
 - 3. Install the same manufacturer, except as otherwise specified.
 - 4. Install materials and equipment in accordance with the manufacturer's instructions.
- B. Factory-Applied Finishes: Repair and/or refinish work damaged by the work of this Division to the Architect's or Engineer's satisfaction. Obtain finishing materials from the equipment manufacturer.
- C. Comply with the requirements for substitutions specified elsewhere in this Section.

2.3 MANUFACTURERS

- A. Qualifications: Firms regularly engaged in the manufacture of products specified, of types and capacities required, whose products have been in satisfactory use in similar service for not less than five years, unless otherwise specified.
- B. Subject to compliance with the specified requirements, provide material or product from one of the manufacturers listed for each item.

PART 3 - EXECUTION

3.1 GENERAL

- A. Provide all necessary offsets and crossovers in piping whether indicated or not.
- B. Install piping parallel to the building structure and vertically plumb.
- C. Examine areas and conditions under which mechanical system materials and products will be installed. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

3.2 CUTTING AND PATCHING

- A. Locate openings and sleeves to permit neat installation of piping and equipment.

3.3 INSTALLATION OF EQUIPMENT AND DEVICES

- A. Install all equipment per the manufacturer's recommendations and the equipment listing.

B. Access:

1. Install all equipment and devices to permit easy access for maintenance.
2. Maintain easy access to all equipment and devices installed as part of Division 23 work, including but not limited to filters, motors, drives, valves, actuators.
3. Proper access shall include:
 - a. Valves can be operated without restriction and over their full range.
 - b. Control devices may be easily adjusted.
 - c. Routine maintenance work, such as lubricating bearings, may be performed readily within an arm's reach.
4. Relocate items that interfere with access.
5. When possible, install work in accessible locations to avoid the need for access panels.
6. Coordinate with the Architect to achieve acceptable locations for access panels.

C. Provide all necessary anchoring devices and supports:

1. Use structural supports suitable for equipment or as indicated.
2. Check loadings and dimensions of equipment with shop drawings.
3. Do not cut members of the building structure unless specifically indicated.
4. Do not weld to the members of the building structure unless specifically indicated.
5. Provide all required equipment supports including those not detailed on architectural and mechanical drawings.
6. Comply with Section 23 05 29, "Supports, Hangers, Anchors and Sleeves for HVAC."

D. Verify that the equipment will fit the support layouts indicated.

1. Where substitute equipment is used, revise supports to fit at no additional cost to the Owner.

E. Coordinate the size and location of penetrations and wall openings with the work of other Divisions.

F. Install equipment on a concrete pad, at least 12" larger on each side than the base of the unit, unless otherwise indicated on the drawings. Coordinate the size and location of equipment pads and curbs with the work of Division 3, "Concrete."

3.4 TESTING

A. General: Provide labor and test equipment, including test pumps, gauges, instruments, and other equipment required. Use calibrated pressure gauges and instruments for all measurements. Use pressure gauges with a range of approximately twice the test pressure.

B. Piping:

1. General: Remove equipment that would be damaged by the test pressure. After testing is complete, replace the equipment.
2. Pressure-test the whole piping systems at one time, whenever possible. Avoid testing piping systems in sections.
3. Correct leaks by remaking joints with new material; makeshift remedies will not be permitted. Test time accrues only while full test pressure is on the system and must hold

without pressure loss for 24 hours. Test before backfilling, concealing, insulating, or connecting to the potable water system.

4. Test Schedule: Test each section of the piping system at 1½ times the maximum working pressure of that section, but at not less than the scheduled test pressure. Obtain maximum working pressures from the Engineer if not indicated on drawings.

C. Valves:

1. Automatic Valves: Test all valves, including solenoid valves, water regulating valves, pressure reducing valves, pressure relief valves, safety valves, and temperature and pressure relief valves, for proper operation at the indicated settings.

D. Piping Specialties: Test thermometers, pressure gauges, flow measuring devices, and water meters for accurate indication. Test automatic water feeders, air vents, vacuum breakers, and other specialties for proper performance.

E. Pumps:

1. Rotation: Verify the correct rotational direction.
2. Motor Amperage: Verify operating amperage does not exceed motor nameplate rating.
3. Pump Shut-off Discharge Head: Verify actual head corresponds to the submittal data.

F. Test as specified: As recommended by equipment manufacturer; and as otherwise necessary or directed to assure they are complete, operable, and ready for use.

3.5 ADJUSTING AND CLEANING

- A. Inspect all equipment and put in good working order.
- B. Remove all waste and foreign materials from the project area.
- C. Remove all dirt, grease, splashed paint, and plaster from mechanical equipment and systems.
- D. Restore damaged finishes to their original condition.
- E. Piping: Flush the interior of all water piping with clean water. Upon completion of flushing, drain systems at the low points and remove, clean, and replace strainer baskets. Refill the piping systems with clean water and add treatment chemicals.
- F. Adjusting: Adjust equipment and system components as indicated or as otherwise required to result in intended system operation. Readjustment equipment and systems as needed to refine performance and effect complete system tune-up.

3.6 SPECIAL TOOLS

- A. Furnish specialized tools to the Owner no later than the date of beneficial occupancy.
- B. Definition of Special Tools: Identified in or otherwise implied by the manufacturer's operation and maintenance manuals for the furnished equipment, or which are otherwise required for the operation, with the manufacturer's recommended procedures for operation, adjustment, and maintenance. Special tools do not include those required for major repairs normally done by

factory trained personnel, nor do they include those normally found in the possession of the Owner's on-site maintenance personnel.

3.7 MANUFACTURER'S START-UP ASSISTANCE

- A. Where the services of a factory-authorized service representative are specified for the start-up of equipment, arrange to have the manufacturer perform start-up and check-out service. The manufacturer shall provide a letter which shall be on the manufacturer's letterhead. The letter shall list the equipment, certify that the equipment has been examined, and that it has been installed per the manufacturer's installation instructions, started up, adjusted, and checked out per the manufacturer's instructions, and is operating properly. The letter shall be addressed to the Owner and signed by an authorized manufacturer representative.

3.8 PUTTING SYSTEMS IN OPERATION – START-UP

- A. Prior to final acceptance, at time agreed to by the Owner and the Architect, put all systems into satisfactory operation.
- B. Operate all systems in good working order for a period of fourteen (14 working days).
- C. Perform services in accordance with the manufacturer's written start-up instructions. Test the control and instrumentation system and demonstrate compliance with requirements. Replace damaged or malfunctioning controls and equipment.
- D. Maintenance and Operation Training:
 - 1. As a part of the maintenance and operating instructions, review data in operating and maintenance manual, including preventative maintenance schedule and procedures, and procedures for obtaining repair parts and technical assistance. Demonstrate all phases of operation including start-up and shutdown.
 - 2. Schedule training with the Owner. Provide at least 7-day notice to the Architect and Engineer.

3.9 CLEAN UP

- A. The contractor shall provide the necessary personnel to clean debris associated with this scope of work. Materials to be installed shall be stored in an organized manner so as not to interfere with the installation operations of this trade or other trades. Hazardous or toxic materials shall be disposed of consistent with OSHA and EPA Regulations.

3.10 GUARANTEE

- A. Be responsible for work done and material and equipment installed as part of the contractual requirements of Drawings and Specifications. Repair or replace, as may be necessary, any defective work, material, or parts which may show itself within the guarantee period. Be responsible for damage to other materials, furnishing, equipment, or premises caused by such defects during this period, if in the opinion of the Engineer said defect is due to imperfection of material or workmanship. Provide all such work and materials at no cost to Owner. Extend all Equipment Manufacturer Warranties to the Owner.
 - 1. The Guarantee Period shall be one (1) year from date of beneficial use by the Owner.

- a. Where other guarantee periods or requirements are called for in other sections of the contract documents, they shall take precedence over the one-year requirement of this Section.
- B. Be responsible for damage to any part of premises during the guarantee period caused by leaks or breaks in work furnished and/or installed under this Section.
- C. Replace refrigerant, lubricants, or gases lost as result of defects, breaks, or leaks in work.
- D. Provide to the Owner, supplied by the contractor, a written form stating the terms, conditions, dates of the guarantee, and the guarantee period.

END OF SECTION

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SECTION 23 05 00

COMMON WORK RESULTS FOR HVAC

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 as fully as if repeated here.

1.2 SUMMARY

- A. This Section includes:
 - 1. Piping materials and installation instructions common to piping systems.
 - 2. Dielectric fittings.
 - 3. Mechanical sleeve seals.
 - 4. Sleeves.
 - 5. Grout.
 - 6. Mechanical demolition.
 - 7. Equipment installation requirements common to equipment sections.
 - 8. Painting and finishing.
 - 9. Supports and anchorages.

1.3 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspace, and tunnels.
- B. Exposed Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include equipment service yards.
- D. Concealed Interior Installations: Concealed from view and protected from physical contact by building occupants.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

1.4 SUBMITTALS

- A. Product Data: Provide for the following:
 - 1. Dielectric fittings.
 - 2. Mechanical sleeve seals.
 - 3. Sleeves.

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4. Grout.

B. Welding certificates.

1.5 QUALITY ASSURANCE

A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."

B. Steel Pipe Welding:

1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
2. Certify that each welder has passed AWS qualification tests for the welding processes involved and that certification is current.

C. Electrical Characteristics for Mechanical Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers and conduit sizes are appropriately modified. Proposed equipment shall specify minimum energy ratings or efficiencies and comply with requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes and store and handle to prevent pipe end damage and entrance of dirt, debris, and moisture.

1.7 COORDINATION

A. Arrange for pipe spaces, chases, slots, and openings in the building structure during construction to allow for mechanical installations.

B. Coordinate installation of required supporting devices and set sleeves for poured-in-place concrete and other structural components as constructed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the manufacturers specified.

2.2 PIPE, TUBE, AND FITTINGS

A. Refer to individual piping sections for pipe, tube, fitting materials, and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

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2.3 JOINING MATERIALS

- A. Refer to individual piping sections for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of the piping system content.
 - 1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
 - a. Full-Face Type: For flat-face, Class 125, cast-iron, and cast-bronze flanges.
 - b. Narrow-Face Type: For raised-face, Class 250, cast-iron, and steel flanges.
 - 2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
- C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- D. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- E. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.4 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.
 - 1. Acceptable Manufacturers:
 - a. Epco Sales
 - b. Watts
 - c. Wilkins
- D. Dielectric Flanges: Factory-fabricated, companion-flange assembly for 150 or 300-psig minimum working pressure as required to suit system pressures.
 - 1. Acceptable Manufacturers:
 - a. Epco Sales
 - b. Watts Industries
 - c. CTS Flange
- E. Dielectric-Flange Kits: Companion-flange assembly for field assembly. Include flanges, full-face or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
 - 1. Acceptable Manufacturers:
 - a. Advance Products & Systems, Inc.

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- b. Calpico, Inc.
 - c. Central Plastics Company.
 - d. Pipeline Seal and Insulator, Inc.
 - 2. Separate companion flanges and steel bolts and nuts shall have 150 or 300- psig minimum working pressure where required to suit system pressures.
- F. Dielectric Nipples: Brass with inert and noncorrosive thermoplastic lining with plain, threaded, or grooved ends and 300-psig minimum working pressure at 225 deg F.
- 1. Acceptable Manufacturers:
 - a. Precision Plumbing Products
 - b. Sioux Chief
 - c. Victaulic

2.5 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
- 1. Acceptable Manufacturers:
 - a. Link Seal
 - b. Centry-Line
 - c. Calpico
 - 2. Sealing Elements: EPDM interlocking links shaped to fit the surface of the pipe. Include the type and number required for pipe material and the size of the pipe.
 - 3. Pressure Plates: Carbon steel. Include two for each sealing element.
 - 4. Connecting Bolts and Nuts: Carbon steel with a corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.6 SLEEVES

- A. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized with plain ends.
- B. Molded PVC: Permanent, with a nailing flange for attaching to wooden forms.
- C. PVC Pipe: ASTM D 1785, Schedule 40.

2.7 GROUT

- A. Description: ASTM C 1107, Grade B, non-shrink and nonmetallic, dry hydraulic-cement grout.
- 1. Post-hardening, volume-adjusting, non-staining, noncorrosive, nongaseous, and recommended for exterior applications.
 - 2. 5000-psi design mix with 28-day compressive strength.
 - 3. Premixed and factory packaged.

PART 3 - EXECUTION

3.1 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping in equipment rooms and service areas at right angles or parallel to the building walls. Diagonal runs are prohibited unless expressly indicated otherwise.
- B. Install piping to permit valve servicing.
- C. Install piping at indicated slopes.
- D. Install piping free of sags and bends.
- E. Install fittings for changes in direction and branch connections.
- F. Install piping to allow the application of insulation.
- G. Select system components with pressure ratings equal to or greater than system operating pressure.
- H. Install sleeves for pipes passing through concrete.
 - 1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below the floor slab as required to secure clamping ring if ring is specified.
 - 2. Install sleeves that are large enough to provide ¼-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
 - a. PVC Pipe Sleeves: For pipes smaller than NPS 6.
 - 3. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation using joint sealants appropriate for size, depth and location of joint.
- I. Verify final equipment locations for roughing-in.
- J. Refer to equipment specifications in other Sections for roughing-in requirements.

3.2 PIPING JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs.
- B. Remove scale, slag, dirt, and debris from inside and outside pipe and fittings before assembly.
- C. Soldered Joints: Construct joints according to ASTM B 828 "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- D. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.

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2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- E. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 “Quality Assurance” Article.
- F. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

3.3 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
 1. Install flanges in piping, NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
 2. Wet Piping Systems: Install dielectric nipple fittings to connect piping materials of dissimilar metals.

3.4 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow the right of way for piping to be installed at the required slope.

3.5 PAINTING

- A. Painting of mechanical systems, equipment, and components is specified in Division 9, “Finishes.”
- B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match the original factory finish.

3.6 CONCRETE BASES

- A. Concrete Bases: Anchor equipment to the concrete base as shown on the DSA-approved contract documents, and in accordance with code requirements.
 1. Place and secure anchorage devices. Use the equipment manufacturer’s drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 2. Install anchor bolts to elevations required for proper attachment to supported equipment.
 3. Install anchor bolts according to anchor-bolt manufacturer’s written instructions.

COMMON WORK RESULTS FOR HVAC 23 05 00 - 6

3.7 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 05, “Metal Fabrications” for structural steel and pipe support structures.
- B. Cut, fit and place metal supports accurately in location, alignment, and elevation to support and anchor mechanical piping, materials, and equipment.
- C. Field Welding: Comply with AWS D1.1.

3.8 GROUTING

- A. Follow the manufacturer’s recommendations.

END OF SECTION

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SECTION 23 05 13

COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. The Section includes general requirements for single-phase and polyphase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on AC power systems up to 600 V and installed at the equipment manufacturer's factory or shipped separately by the equipment manufacturer for field installation.

1.3 COORDINATION

- A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:
 - 1. Motor controllers.
 - 2. Torque, speed, and horsepower requirements of the load.
 - 3. Ratings and characteristics of a supply circuit and required control sequence.
 - 4. Ambient and environmental conditions of installation location.

PART 2 - PRODUCTS

2.1 GENERAL MOTOR REQUIREMENTS

- A. Comply with NEMA MG 1 unless otherwise indicated.
- B. Comply with IEEE 841 for severe-duty motors.

2.2 MOTOR CHARACTERISTICS

- A. Duty: Continuous duty at ambient temperature of 105 deg F and at sea level.
- B. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at the installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

2.3 POLYPHASE MOTORS

- A. Description: NEMA MG 1, Design B, medium induction motor.
- B. Efficiency: Energy efficient, as defined in NEMA MG 1.
- C. Service Factor: 1.15.

COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT 23 05 13 - 1

- D. Multispeed Motors: Variable torque.
 - 1. For motors with 2:1 speed ratio, consequent pole, single winding.
- E. Rotor: Random-wound, squirrel cage.
- F. Bearings: Regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading.
- G. Temperature Rise: Match insulation rating.
- H. Insulation: Class F.
- I. Code Letter Designation:
 - 1. Motors 15 HP and Larger: NEMA starting Code F or Code G.
 - 2. Motors Smaller than 15 HP: Manufacturer's standard starting characteristic.
- J. Enclosure Material: Cast iron for motor frame sizes 324T and larger; rolled steel for motor frame sizes smaller than 324T.
- K. Use totally enclosed, fan cooled (TEFC) motors for all outdoor applications and for motors subject to moisture.

2.4 POLYPHASE MOTORS WITH ADDITIONAL REQUIREMENTS

- A. Motors Used with Variable Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.
 - 1. Windings: Copper magnet wire with moisture-resistant insulation varnish, designed and tested to resist transient spikes, high frequencies, and short time rise pulses produced by pulse-width modulated inverters.
 - 2. Energy- and Premium-Efficient Motors: Class B temperature rise; Class F insulation.
 - 3. Inverter-Duty Motors: Class F temperature rise; Class H insulation.
 - 4. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.
- B. Severe-Duty Motors: Comply with IEEE 841, with 1.15 minimum service factor.

2.5 SINGLE-PHASE MOTORS

- A. Motors 1 hp or less shall be an Electronically commutated (EC) style motor unless otherwise noted.
- B. Bearings: Pre-lubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.
- C. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT 23 05 13 - 2

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

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SECTION 23 05 14

VARIABLE FREQUENCY DRIVES

PART 1 - GENERAL

1.1 CONDITIONS AND REQUIREMENTS

- A. General: All provisions of the General Conditions, Supplementary Conditions, Notice to Bidders, other front-end documents, Division 1 Specifications, other Divisions of the Specifications and all drawings apply to the work of this Section as fully as if repeated here.

1.2 DESCRIPTION

- A. Work Included: This Section describes the requirements for variable frequency motor drives. The work includes but is not necessarily limited to:
 - 1. Providing variable frequency drives for the equipment indicated on the drawings.
 - 2. Providing NEMA 4 ventilated enclosures for variable frequency drive assemblies.
 - 3. Insuring compatibility between variable frequency drives and the connected electric motors.
 - 4. Insuring compatibility between variable frequency drives and the facility management and control system.
 - 5. Insuring compatibility between variable frequency drives and the building electrical service.
- B. Electrical Requirements: All provisions of Division 26 apply to the work of this Section as fully as if repeated here.
- C. Work Described Elsewhere: Common Work Results for HVAC, Hydronic Pumps, Controls and Instrumentation, Testing, Adjusting and Balancing, and Startup and Commissioning work are described in other Sections of Division 23.
 - 1. Hydronic Pumps, Section 23 21 23.

1.3 QUALITY ASSURANCE

- A. Codes, Regulations and Standards:
 - 1. NFPA 70, National Electric Code.
 - 2. UL, Standards.

1.4 SUBMITTALS

- A. General: Provide submittals for all equipment and materials including variable frequency drives, ventilated electrical enclosures, and accessories. Include shop drawings, dimensions and weights, master wiring diagrams, elementary schematics, control schematics, operating manuals and parts lists.

VARIABLE FREQUENCY DRIVES 23 05 24 - 1

PART 2 - PRODUCTS

2.1 GENERAL

- A. Single Manufacturer: All variable frequency drive assemblies shall be provided by a single manufacturer.

2.2 VARIABLE FREQUENCY DRIVES

- A. General: ABB, Yaskawa, Allen Bradley or equal: Complete, factory-assembled and run-tested, sine-wave pulse width modulated type (PWM), microprocessor-based, digitally-controlled, variable frequency drive (VFD) assembly capable of controlling the speed of the connected, three phase electric motor. The VFD assembly shall be listed by UL and comply with all applicable standards published by ANSI, IEEE and NEMA.
- B. Incoming Electrical Service: Incoming electrical service to the VFD will be 460V (+/- 10%), 60 hertz (+/-5%), 3 phase, 4-wire.
- C. Ambient Conditions: The VFD shall be capable of operating in environments ranging from -10 to +40°C; elevations up to 3,300 feet above sea level; and, with relative humidities of 0 to 90% (non-condensing).
- D. Conversion Efficiency: Provide a minimum efficiency of 95.0% at the rated load.
- E. Overload Rating: Provide 150% overload rating for a 1-minute period.
- F. Enclosure: NEMA 4, wall-mounted, fully-gasketed enclosure housing the drive electronics; 16 gauge steel casing, thoroughly cleaned and phosphatized prior to painting; ventilation openings; exposed metal parts finished with primer coat and baked enamel finish in accordance with ANSI 61.
- G. Ventilation Fan: Thermostatically controlled cabinet ventilation fan.
- H. Withstand Rating: The controllers shall have a short-circuit withstand rating of 65,000 ampere and shall be rated as shown on the drawings. The full load current of the controller shall be equal to the equivalent motor horsepower as listed by NEC Table 430-150.
- I. Operator Controls: Operator controls shall be digital-type, keypad with LED display located on the face of the drive enclosure. and with the following features at a minimum:
 - 1. Stop pushbutton.
 - 2. Start pushbutton.
 - 3. Automatic or manual selection.
 - 4. Forward or reverse selection.
 - 5. LED readout indicating status, diagnostics, settings, input signals and output signals.
 - 6. Means for controlling conditions such as AUTO, MAN, RUN, STOP, BYPASS, JOG, FORWARD or REVERSE.
 - 7. Motor selection transfer switch.
- J. Operating Handle: The position of the handle at the disconnect switch shall indicate the

VARIABLE FREQUENCY DRIVES 23 05 24 - 2

condition of the circuit breaker (ON, OFF or TRIPPED). The handle shall have provisions for padlocking in the OFF position; disconnect handle shall be interlocked with the controller door to prevent opening or closing the door with the handle in the ON position.

K. Features: The VFD assembly shall have the following features:

1. Start, stop and speed control potentiometer terminations.
2. Unidirectional operation.
3. Linear, independent, timed acceleration and de-accelerating ability adjustable from 2 to 60 seconds with 60 Hz top speed (4 to 120 seconds with 120 Hz top speed setting).
4. Full time, adjustable current limit shall sense overload on the motor when current exceeds a preset limit. Output frequency and motor speed shall be reduced. If current decreases with speed, the speed shall decrease until the current drops below the limit. Once current is reduced to normal, the frequency shall return to the original setting.
5. 2 to 60 hertz constant torque, 60 to 120 hertz constant horsepower, with the constant torque range adjustable from 2 to 120 hertz minimum.
6. Frequency stability of 0.5% for 24 hours with voltage regulation of +/- 2% of the maximum rated output voltage.
7. Individual, door-mounted status lights or LEDS.
8. Provisions for internal control power (115VAC). (VFD shall not require an external source for control power).
9. Motor slip-dependent speed regulation.
10. Five-cycle logic power carry-over during utility loss of power.
11. Insensitive to input line rotation.
12. Fixed dwell time at start to increase motor starting torque.
13. Automatic lead-lag transfer feature that alternates the lead pump after each motor shut-down.

L. Protective Features: Provide the following protective features:

1. Input AC circuit breaker with an interlocked, padlocked handle.
2. Input AC line current limiting fuses for fault current protection of converter.
3. Electronic over-current trip for instantaneous and inverse time overload protection.
4. Input AC line under-voltage and phase loss protection.
5. Over-frequency protection.
6. Over-temperature protection.
7. Surge protection from input AC line transients.
8. Electrical isolation between the power and logic circuits as well as between the 115 VAC control power and the static digital sequencing.
9. Door-mounted status lights or LEDS for separate indication of power frequency, instantaneous over-current, DC over-voltage, AC under-voltage, AC loss of phase, emergency stop, overload, over-temperature, inverter pole trip and stand-by modes.
10. Additional door-mounted status lights or LEDS for separate indication of self-diagnostics, including phase loss and microprocessor fault as well as one for each inverter pole gating signal, each inverter pole status and each logic voltage used.
11. dV/dt and di/dt protection for converter semiconductors.
12. Input power line reactors.

M. Adjustments: Provide the following independent adjustments:

VARIABLE FREQUENCY DRIVES 23 05 24 - 3

1. Minimum speed adjustment.
2. Maximum speed adjustment.
3. Full-time adjustable current limit.
4. Acceleration adjustment.
5. De-acceleration adjustment.
6. Low frequency boost adjustment.
7. Volts per hertz adjustment.

N. Features: Provide the following features:

1. Alternating-current contactors.
2. Motor over-current relays.
3. Emergency shutdown of the controller which immediately disconnects the motor.
4. Dynamic braking with 12% duty cycle for quick slowdown or stop.
5. Automatic restart upon return of power following an outage of the incoming power.
6. Output load ammeter, voltmeter and speed indicating meters.
7. Increased dwell time at start to optimize motor starting torque, adjustable from 0.5 to 10 SEC.
8. Door-mounted NEMA 4 operator controls with heavy-duty industrial rated devices.
9. Controller status relay with four contacts, each rated 3 AMPS resistive at 115 VAC, for tripped, ready-to-run, up-to-speed, running and forward- reverse indication. Each contact can be used as normally open or normally closed.
10. Bypass contactor arrangement with overload relay complete with all control circuitry to disconnect the controller from the motor and re- connect the motor to line power after a suitable time delay when initiated manually.
11. Line synchronization circuitry to allow transfer of the motor from the controller at 60 HZ to line power at 60 HZ or back with no time delay. Provide resistor network to absorb voltage mismatch.
12. Fused, thermostat-controlled space heaters to minimize condensation potential upon controller shutdown.
13. Self-diagnostic read-outs.
14. Input signal port (RS422/485) and ability to receive 0-10 VDC or 4-20ma speed signal from the facility management and control system. Provide open protocol configuration or software designed specifically to achieve direct linkage with the manufacturer of the facility management and control system.

O. Factory Tests and Checks: Complete the following minimum tests and checks at the factory prior to shipment to the job site. Provide certification of tests.

1. Inspect and test all drive power transistors, GTO's and diodes including temperature cycling load testing.
2. Inspect and test all integrated circuits. Include pass/fail, temperature cycling (-20 to +85 DEG C) and high ambient temperature (+85 DEG C) testing in accordance with MIL-STD-8813B.
3. Lot sample for parameter and functional characteristics small signal semiconductors, resistors, capacitors and diodes in accordance with MIL-STD-105D (1% AQL).
4. Test all printed circuit boards under a 20 HR temperature cycling load test and then functionally tested via fault-finder bench equipment prior to unit installation.
5. Test all final assemblies at full load with application of line-to-line and line-to-ground bolted faults. Drive shall trip electronically without device failure.

VARIABLE FREQUENCY DRIVES 23 05 24 - 4

6. After all sub-component tests are completed, conduct a 40 HR burn-in test. Conduct test with the controllers at 100% inductive or motor load for 40 HRS without an un-scheduled shutdown.
7. After the burn-in test is complete, conduct a 3 minute cycling load motor test.

PART 3 - EXECUTION

3.1 PROTECTION

- A. Mounting Requirements: Mount enclosure as shown on the drawings.
- B. Storage and Handling: Protect the VFD assembly at all times. Store in a clean, dry environment that provides temperature and humidity within the required range.
- C. If VFDs are not furnished with internal air filter racks, provide temporary filter media to protect VFD cabinets and replace filter media as required.

3.2 INSPECTION

- A. Visually inspect the equipment and components at time of delivery. Submit report to the Owner's Representative with a list of items or deficiencies to be corrected.

3.3 INSTALLATION

- A. Install the VFD system in accordance with details, approved Shop Drawings and manufacturer's instructions and recommendations.
- B. Mounting Requirements: Mount enclosure as shown on the drawings.
- C. Provide field low voltage wiring of VFD system components. Provide field interconnecting wiring between VFD and filters, line reactors and the wiring is not installed at factory. Install wiring in metal conduit and in accordance with Electrical sections of this Specification and applicable Electrical Code.
- D. Provide control wiring between interlocks in VFD control circuits and driven motor's disconnect switches, where such motor disconnect switches are provided.
- E. Do not connect ground from one unit to another unit's cabinet.
- F. Use separate conduits for incoming and outgoing power conductors from each unit.
- G. Use separate conduit for control wiring for each unit. Do not combine control wiring with power wiring.
- H. Use minimum 18 ga shielded wiring with ground for control wiring.
- I. Unless otherwise indicated, mount VFD so that display and keypad are at approximately 5'-0" to 5'-6" above the floor.

3.4 START UP

- A. The VFD manufacturer shall perform field inspections, start-up and testing of VFD in accordance with procedures as defined by the manufacturer for proper operation.
- B. Adjust critical frequency avoidance feature to step over frequencies which cause excessive vibration in driven equipment.

3.5 QUALITY CONTROL

- A. Field Checks and Tests: Upon completion of the work, before energizing the drive assembly, the manufacturer's representative shall inspect the assembly and certify that it is ready for start-up.
- B. Start-Up: Start-up the drive assembly in the presence of the manufacturer's representative. Complete all final inspections, tests, calibrations and adjustments including functional tests. Submit a start-up report.
- C. Programming Report: Submit a report documenting all initial VFD programming parameters and settings implemented at the factory or during startup.
 - 1. Include communication parameters used to interface with the automation system.
 - 2. Provide hard copy and electronic spreadsheets.
 - 3. If drives are equipped with an interface to download/upload settings, provide Owner with downloadable settings on appropriate media.

END OF SECTION

SECTION 23 05 19

METERS AND GAUGES FOR HVAC PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Bimetallic-actuated thermometers.
- 2. Filled-system thermometers.
- 3. Liquid-in-glass thermometers.
- 4. Light-activated thermometers.
- 5. Thermowells.
- 6. Dial-type pressure gages.
- 7. Gage attachments.
- 8. Test plugs.
- 9. Test-plug kits.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:
 - 1. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of meter and gauge.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For meters and gages to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 LIQUID-IN-GLASS THERMOMETERS

- A. Metal-Case, Compact-Style, Liquid-in-Glass Thermometers:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the work include the following, or equal:
 - a. Terice, H. O. Co.

METERS AND GAUGES FOR HVAC PIPING 23 05 19 - 1

- b. Weiss Instruments, Inc.
 - c. Weksler Glass Thermometer Corp.
- 2. Standard: ASME B40.200.
- 3. Case: Cast aluminum; 12-inch nominal size.
- 4. Case Form: Back angle unless otherwise indicated.
- 5. Tube: Glass with magnifying lens and blue or red organic liquid.
- 6. Tube Background: Nonreflective aluminum with permanently etched scale markings graduated in deg F.
- 7. Window: Glass or plastic.
- 8. Stem: Brass of the length to suit installation.
 - a. Design for Thermowell Installation: Bare stem.
- 9. Connector: 3/4 inch, with ASME B1.1 screw threads.
- 10. Accuracy: Plus or minus 1 percent of scale range or one scale division, to a maximum of 1.5 percent of scale range.

2.2 THERMOWELLS

A. Thermowells:

- 1. Standard: ASME B40.200.
- 2. Description: Pressure-tight, socket-type fitting made for insertion in piping tee fitting.
- 3. Material for Use with Steel Piping: CRES
- 4. Type: Stepped shank unless straight or tapered shank is indicated.
- 5. External Threads: NPS 3/4, or NPS 1, ASME B1.20.1 pipe threads.
- 6. Internal Threads: 1/2, 3/4, and 1 inch, with ASME B1.1 screw threads.
- 7. Bore: Diameter required to match thermometer bulb or stem.
- 8. Insertion Length: Length required to match thermometer bulb or stem.
- 9. Lagging Extension: Include on thermowells for insulated piping and tubing.
- 10. Bushings: For converting size of thermowell's internal screw thread to size of thermometer connection.

B. Heat-Transfer Medium: Mixture of graphite and glycerin.

2.3 DIAL-TYPE PRESSURE GAGES

A. Direct-Mounted, Metal-Case, Dial-Type Pressure Gages:

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the work include the following, or equal:
 - a. Terice, H. O. Co.
 - b. Weiss Instruments, Inc.
 - c. Weksler Glass Thermometer Corp.
- 2. Standard: ASME B40.100.
- 3. Case: Sealed type(s); cast aluminum or drawn steel; 4-1/2-inch nominal diameter.
- 4. Pressure-Element Assembly: Bourdon tube unless otherwise indicated.
- 5. Pressure Connection: Brass, with NPS 1/4 or NPS 1/2, ASME B1.20.1 pipe threads and bottom-outlet type unless back-outlet type is indicated.
- 6. Movement: Mechanical, with link to pressure element and connection to pointer.
- 7. Dial: Nonreflective aluminum with permanently etched scale markings graduated in psi.
- 8. Pointer: Dark-colored metal.
- 9. Window: Glass.

10. Ring: Metal.
11. Accuracy: Grade A, plus or minus 1 percent of middle half of scale range.

2.4 GAGE ATTACHMENTS

- A. Snubbers: ASME B40.100, brass; with NPS 1/2, ASME B1.20.1 pipe threads and surge dampening device. Include extension for use on insulated piping.
- B. Siphons: Loop-shaped Section of brass or stainless-steel pipe with NPS 1/4 or NPS 1/2 pipe threads.
- C. Valves: Brass or stainless-steel needle, with NPS 1/4 or NPS 1/2, ASME B1.20.1 pipe threads.

2.5 TEST PLUGS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the work include the following or equal:
 1. Weksler Glass Thermometer Corp.
 2. Trerice, H. O. Co.
 3. Weiss Instruments, Inc.
- B. Description: Test-station fitting made for insertion in piping tee fitting.
- C. Body: Brass or stainless steel with core inserts and gasketed and threaded cap. Include extended stem on units to be installed in insulated piping.
- D. Thread Size: NPS 1/4 or NPS 1/2, ASME B1.20.1 pipe thread.
- E. Minimum Pressure and Temperature Rating: 500 psig at 200 deg F.
- F. Core Inserts: Chlorosulfonated polyethylene synthetic and EPDM self-sealing rubber.

2.6 TEST-PLUG KITS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the work include the following, or equal:
 1. Flow Design, Inc.
 2. Trerice, H. O. Co.
 3. Weiss Instruments, Inc.
- B. Furnish one test-plug kit(s) containing one thermometer(s), one pressure gage and adapter, and carrying case. Thermometer sensing elements, pressure gauge, and adapter probes shall be of diameter to fit test plugs and of length to project into piping.
- C. Low-Range Thermometer: Small, bimetallic insertion type with 1- to 2-inch- diameter dial and tapered-end sensing element. Dial range shall be at least 25 to 140 deg F.
- D. High-Range Thermometer: Small, bimetallic insertion type with 1- to 2-inch- diameter dial and tapered-end sensing element. Dial range shall be at least 0 to 220 deg F.

METERS AND GAUGES FOR HVAC PIPING 23 05 19 - 3

- E. Pressure Gauge: Small, Bourdon-tube insertion type with 2- to 3-inch- diameter dial and probe. Dial range shall be at least 0 to 200 psig.
- F. Carrying Case: Metal or plastic, with formed instrument padding.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install thermowells with socket extending to center of pipe and in vertical position in piping tees.
- B. Install thermowells of sizes required to match thermometer connectors. Include bushings if required to match sizes.
- C. Install thermowells with extension on insulated piping.
- D. Fill thermowells with heat-transfer medium.
- E. Install direct-mounted thermometers in thermowells and adjust vertical and tilted positions.
- F. Install direct-mounted pressure gages in piping tees with pressure gauge located on pipe at the most readable position.
- G. Install valve and snubber in piping for each pressure gage for fluids.
- H. Install test plugs in piping tees.
- I. Assemble and install connections, tubing, and accessories between flow-measuring elements and flowmeters according to manufacturer's written instructions.
- J. Install thermometers in the following locations:
 - 1. Inlet and outlet of each boiler and chiller.
 - 2. Each chilled and hot water supply and return main serving the school campus.
- K. Install pressure gages in the following locations:
 - 1. Discharge of each pressure-reducing valve.
 - 2. Install gauges in the threaded tapings on suction and discharge flanges of each pump.

3.2 CONNECTIONS

- A. Allow space for servicing and maintaining meters, and similar instruments.

3.3 ADJUSTING

- A. After installation, calibrate meters according to the manufacturer's written instructions.
- B. Adjust faces of meters and gages to the proper angle for best visibility.

METERS AND GAUGES FOR HVAC PIPING 23 05 19 - 4

3.4 THERMOMETER SCHEDULE

- A. Thermometers at inlets and outlets of each hydronic heat exchanger shall be the following:
 - 1. Industrial-style, liquid-in-glass type with 12" scale.
- B. Thermometer stems shall be of length to match thermowell insertion length.

3.5 THERMOMETER SCALE-RANGE SCHEDULE

- A. Scale Range for Heating Hot Water Piping: 0 to 250 deg F.
- B. Scale Range for Chilled Water Piping: 0 to 100 deg F.

3.6 PRESSURE-GAGE SCHEDULE

- A. Pressure gages at discharge of each pressure-reducing valve shall be the following:
 - 1. Sealed, direct-mounted, stainless steel case.
- B. Pressure gages at suction and discharge of each pump shall be the following:
 - 1. Liquid-filled, direct-mounted, stainless steel case.

3.7 PRESSURE-GAGE SCALE-RANGE SCHEDULE

- A. Scale range for heating and chilled water piping: 0 to 100 psi.

END OF SECTION

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SECTION 23 05 23

GENERAL DUTY VALVES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. All drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specifications, apply to this Section as fully as if repeated here.
- B. General duty valves for HVAC include gate, globe, check, ball, and butterfly valves.
- C. Related Sections include the following:
 - 1. Section 23 00 00, "Basic HVAC Requirements"
 - 2. Section 23 05 00, "Common Work Results for HVAC"
 - 3. Section 23 05 29, "Supports, Hangers, Anchors and Sleeves"
 - 4. Section 23 07 19, "HVAC Pipe Insulation"
 - 5. Section 23 21 13, "Hydronic Piping"

1.2 SUBMITTALS

- A. Provide submittals as required:
 - 1. Division 01, General Requirements.
 - 2. Section 23 00 00, "Basic HVAC Requirements."
- B. Product Data: Manufacturer's latest published data for materials, capacity, performance, routine service and installation.
- C. For each type of valve indicated, include body, seating, and trim materials; valve design; pressure and temperature classifications; end connections; arrangement; dimensions; and required clearances. Include list indicating valve and its application. Include rated capacities; pressure differential range, shipping, installed, and operating weights; furnished specialties; and accessories.
- D. Provide operation and maintenance manuals per specification Section 23 00 00, and Division 1 requirements.

1.3 REFERENCES AND STANDARDS

- A. References and standards as required by Section 23 00 00 and Division 1, General Requirements.
- B. American Society of Mechanical Engineers/American National Standards Institute.
 - 1. ASME/ANSI B16.10 - Face to Face and End to End Dimension of Valves
 - 2. ASME/ANSI B16.34 - Cast Iron Flanges and Flanged Fittings
 - 3. ASME B31.9 - Standards of Pressure Piping - Building Services Piping
- C. American Society for Testing and Materials.

GENERAL DUTY VALVES - 1

1. ASTM A216 Grade WCB - Cast Carbon Steel

D. Manufacturer's Standardization Society of the Valve and Fittings Industry.

1. MSS-SP-67 - Butterfly Valves.
2. MSS-SP-70 - Cast Iron Gate Valves, Flanged and Threaded Ends.
3. MSS-SP-72 - Ball Valves with Flanged or Butt-welded Ends for General Service.
4. MSS-SP-80 - Bronze Gate, Globe, Angle, and Check Valves.

E. National Sanitary Foundation.

1. NSF/ANSI 61 - Drinking Water System Components - Health Effects

1.4 QUALITY ASSURANCE

- A. Refer to Section 23 00 00, Basic HVAC Requirements and Division 01, General Requirements.
- B. Valves and valve construction shall be suitable for the pressure, temperature, and fluid quality of the service in which they are to be used.
- C. All valves shall be manufactured in accordance with ANSI, AWWA, ASTM, MSS-SP-70 & 80 standards and specifications.
- D. ASME B31.1 for power piping valves and ASME B31.9 for building services piping valves.
- E. ASME B16.10 and ASME B16.34 for dimension and design criteria.
- F. NSF Compliance: NSF 61 for valve materials for potable-water service.
- G. Minimum test pressure for all valves shall be 1.5 times maximum system working pressure unless noted otherwise.
- H. Butterfly valves shall be suitable for dead end service and constructed of industrial design quality.

1.5 WARRANTY

- A. Warranty of materials and workmanship shall be as required by Section 23 00 00 and Division 01, General Requirements.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
 1. Check valves:
 - a. Bronze: Milwaukee, Nibco, Stockham, or equal
 - b. Gray-iron swing check: Milwaukee, Nibco, Stockham, or equal
 - c. Spring-loaded, lift-disc check valves: Metraflex 900 series, Milwaukee, Mueller, Nibco, Val-Matic, Victaulic, or equal.

GENERAL DUTY VALVES - 2

2. Ball Valves: Apollo 70-100/200 series, Milwaukee, Nibco, Stockham, or equal.
3. Balancing Valves: Armstrong Type CBV, B&G Circuit Setter Plus, Taco Accu-Flo, or equal.
4. Self-contained Control Valves: Bell & Gossett, Danfoss, Taco, or equal.
5. Butterfly Valves: Nibco, Stockham, Milwaukee, or equal.

2.2 GENERAL

- A. Provide valves of same manufacturer for the same service. Valve pressure and temperature ratings shall be not less than indicated and as required for system pressures and temperatures.
- B. Provide valves with manufacturer's name and pressure rating clearly and permanently marked on the outside of body.
- C. Provide valves suitable for connection to adjoining piping as specified for pipe joints.
- D. Valves shall be full pipe size unless noted otherwise.
- E. Provide valves identified for future connection with lockable handles.
- F. Valve seats shall be rated to 240 degrees F minimum without deterioration.
- G. Provide lockable handle at valves serving expansion tanks.

2.3 CHECK VALVES

- A. Swing Type: Provide for water services: 2 inch and smaller with screwed bonnet, screwed, soldered, or pressed end; 2-1/2 inch and larger with bolted bonnet, flanged end. Valves shall have renewable bronze seat and disc.
- B. Silent Type: Provide on pumps larger than 2-inch discharge. Valves shall have cast iron body with bronze or stainless-steel trim, spring loaded, and to be of the center guide type, with flanged ends.

2.4 BALL VALVES

- A. Provide ball valves for isolation and as drain valves, in water systems up to 200 degrees F and pipe sizes up to 2 inch and as shown on drawings or specified for other systems.
- B. Provide ball valves of the bronze top-entry body type, having a straight-through full port flow passage, with soldered or pressed ends. Provide extended neck where used on insulated piping.
- C. Provide stainless steel ball and stem.
- D. Construct seats and gland packing of glass filled Teflon with a threaded packing gland follower; blowout-proof stem rated at 600 psig WOG.
- E. Provide lever for quarter turn operation; lever to indicate open or closed position.
- F. When used as drain valves, provide with hose thread, and brass cap. Cap shall be rated for full system pressure.

GENERAL DUTY VALVES - 3

- G. Nibco Ball valve FP-600.

2.5 BALANCING VALVES

- A. Balancing valve for water service shall be of the calibrated balance valve type with capped pressure/temperature ports, positive shutoff angle globe type, with adjustable memory stop and indicator.
- B. Valves 2" and smaller: Bronze or copper alloy body with calibrated ball, globe or venturi/valve arrangement, integral pointer, and calibrated scale to register degree of valve opening. Provide memory stop, threaded, soldered, or pressed ends, with or without integral unions, P/T or Schrader type pressure taps with integral check valves and seals and adjustable memory stop. Valves shall be suitable for 200 psig water working pressure at 250 degrees F.

2.6 BUTTERFLY VALVES

- A. Shut-Off Valves (2-1/2" and Larger): Nibco WD 2000, Grinnell, Centerline, or equal; Lug-type butterfly valve; ductile iron body per ASTM A-536; 200 LB WOG service rating; aluminum-bronze disc; type 416 stainless steel stem; EPDM seat.
 - 1. 10-position lever-lock operator for valves 6" and smaller.
 - 2. Gear and hand wheel operator for valves 8" and larger.
 - 3. Gear and chain wheel operator for valves located more than 84" above the adjacent floor.

2.7 DRAIN VALVES

- A. Drain Valves: 1/2" or 3/4" ball valve, 1/2" or 3/4" short nipple or adapter, with ASME B1.20.7, hose-thread outlet and cap.

2.8 VALVE ACTUATORS

- A. Provide chainwheel for valves 7-feet or higher from the adjacent floor. Construct of cast or ductile iron, with adjustable sprocket rims and chain guides. Use galvanized or brass chain and chain closure links to form a continuous loop of chain at each operator.
- B. Provide gear drive for quarter-turn valves 8-inch and larger.
- C. Provide handwheel for valves other than quarter-turn types.
- D. Provide lever handle for quarter-turn valves 6-inch and smaller, except plug valves.
- E. For plug valves with square heads, furnish Owner with one wrench for every 10 plug valves, for each size square plug head.

PART 3 - EXECUTION

3.1 PRE-INSTALLATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling. Protect internal parts against rust and corrosion. Protect threads, flange faces, grooves, and weld ends.

GENERAL DUTY VALVES - 4

- B. Store valves indoors and maintain at higher than ambient dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.
- D. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations. Examine threads on valve and mating pipe for form and cleanliness. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage. Do not attempt to repair defective valves; replace with new valves.
- E. Properly align piping before installation of valves in an upright position.

3.2 INSTALLATION

- A. Install valves so that they are accessible for repacking. Locate valves for easy access and provide separate support where necessary.
- B. Install valves with stem vertical and handle up wherever possible, never with stem below horizontal position.
- C. Install valves with operating clearance for handle and stem in position to allow full stem movement.
- D. Install swing check valves in horizontal position with hinge pin level. Install dual-plate check valves in horizontal or vertical position, between flanges. Install lift check valves with stem upright and plumb. Provide swing check valves where specified and detailed. In such cases, provide isolation valves to allow repair or replacement of check valve.
- E. Install isolation valves on equipment so that valve and piping do not interfere with equipment removal or maintenance. Install unions or flanges on equipment side of valves arranged to allow service, maintenance, and equipment removal without system shutdown.
- F. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.3 VALVE ACCESSORIES

- A. Provide valves of a design permitting packing while open and under pressure.
- B. Provide 3/4 inch (minimum) drain valves with threaded ends for hose connections at drain points, at main shutoff valves, low points of piping systems, bases of vertical risers, and at equipment.
- C. Provide required manual or automatic vent valves at high points of piping systems to facilitate venting of air and to ensure quiet operation.
- D. Provide renewable bronze seat rings and bronze spindles for cast iron body valves.
- E. Provide chain operated sheaves and chains for all valves which are more than 10 feet above the

GENERAL DUTY VALVES - 5

floor in mechanical equipment rooms. Extend chains to within 84 inches above finished floor.

- F. Provide an isolation valve in the common supply line and an individual balance valve in the return line from each hydronic coil.
- G. Provide an isolation valve downstream of the balancing valve and other components in the return line from each hydronic coil, heat exchanger, and all heat transfer equipment to facilitate removal of the balance valve.

3.4 OPERATION AND MAINTENANCE MANUALS

- A. Provide operation and maintenance manuals to owners operating and maintenance staff for plumbing systems and equipment per specification Division 23 and section 23 08 00 requirements.

END OF SECTION

SECTION 23 05 29

SUPPORTS, HANGERS, ANCHORS AND SLEEVES

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 as fully as if repeated here.
- B. The work of this section includes, but is not limited to:
 - 1. Pipe, equipment hangers, anchors, and supports.
 - 2. Sleeves, escutcheons.

1.2 REFERENCES

- A. Manufacturer's Standardization Society of the Valve and Fitting Industry Inc.:
 - 1. MSS SP-58 Pipe Hangers and Supports – Materials, Design and Manufacturer.
 - 2. MSS SP-69 Pipe Hangers and Supports – Selection and Application.

1.3 SUBMITTALS

- A. Include a layout of sleeve locations for pipes in masonry and concrete floors and walls. Include elevations and sleeve sizes.
- B. Submit details of hangers, anchors, and supports for each pipe size and service, and each piece of equipment.

1.4 QUALITY ASSURANCE

- A. Construct hangers and supports according to the following standards:
 - 1. Building Services Piping Code: ANSI B31.9.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Pipe Hangers: Grinnell, Anvil, Elcen, Pipe Shields, B-Line, Power Strut, Unistrut, or approved equal. Anvil figure numbers are listed below; equivalent material by specified manufacturers is acceptable.
- B. Sleeves: Pipe Shields, Insul, RK Industries, or equal.
- C. Pipe Wrap Tape: Polycen, Nassua, 3M, or equal.
- D. Firestop: Nelson, Dow, 3M, Hilti, or equal.

SUPPORTS, HANGERS, ANCHORS AND SLEEVES 23 05 29 - 1

- E. Escutcheon Plates: Beaton & Corbin Manufacturing, or equal.
- F. Mechanical Sleeve Seals: Pipeline Seal and Insulator, Thunderline Linkseal, Calpico Pipe Linx, Metraflex Metraseal, or equal.

2.2 GENERAL

- A. Provide hangers of heavy construction suitable for the size of pipe to be supported. Materials shall be of steel, except pipe rolls of wrought or malleable iron.
 - 1. Hangers for pipes larger than four inches shall be swivel ring, wrought pipe clamp, or adjustable wrought clevis type. Pipes less than four inches may use "J" style hangers.
- B. Multiple or trapeze pipe hangers shall be steel channels with welded steel spacers and hanger rods if hanger load calculations are submitted.
- C. Wall support shall be welded steel bracket with hanger. B-Line 3068 Series, Anvil Figures 194, 195 or 199.
 - 1. Provide perforated epoxy painted finish, 16 - 12-gauge minimum steel channels securely anchored to wall structure with interlocking, split type, bolt-secured, galvanized pipe/tubing clamps. B-Line type S channel with B-2000 series clamps, Power-Strut Type PS200 H with PS 1200 clamps or equal.
 - 2. When copper piping is being supported, provide flexible elastomeric/thermoplastic isolation cushion material to completely encircle the piping and avoid contact with the channel or clamp, equal to B-Line B1999 Vibra Cushion, or provide manufacturers clamp and cushion assemblies, B-Line BVT series, Power-Strut PS 004T - PS 106N Series or equal.
- D. Select hangers and supports in accordance with the manufacturer's recommended maximum loading. Hangers shall have a safety factor of 5 of 1.
- E. Hangers shall not be disengaged by movement of supported pipe.
- F. Provide copper plated or felt lined hangers for copper piping or provide 10-mil pipe wrap tape on pipe at hangers. Tape shall extend a minimum of 2 inches beyond hanger saddle on both ends and be wrapped around pipe a minimum of 2 turns.
- G. Steel hanger rods shall be threaded both ends, threaded one end, or continuous threaded, black finish. Provide rods complete with adjusting and lock nuts. Anvil Figures 146, 140 or 253.
- H. Pipe hanger rod size: Pipe 2 inches and smaller: 3/8 inches. Pipe 2-1/2 inches to 3-1/2 inches: 1/2 inches. Pipe 4 to 5 inches: 5/8 inches.
- I. Trapeze pipe suspension: 1-5/8 inches width channel in accordance with manufacturer's published load ratings. Deflection shall not exceed 1/180 of a span. Trapeze supporting rods shall have a safety factor of five; securely anchored to building structure.
- J. Provide saddles or shields under piping hangers and supports, factory fabricated, for all insulated piping. Size saddles and shields for exact fit to mate with pipe insulation.

SUPPORTS, HANGERS, ANCHORS AND SLEEVES 23 05 29 - 2

- K. Beam Clamps:
1. Provide MSS SP-69 Type 23 malleable black iron clamp for attachment to beam flange up to 0.62 inches thick for single threaded rods of 3/8, 1/2, and 5/8-inch diameter, for use with pipe sizes 4-inch and less. Furnish with a hardened steel cup point set screw. Anvil Figure 86.
- L. Anchors shall be fabricated using welding steel shapes, plates, and bars to secure piping to the structure.
- M. Concrete inserts shall be MSS SP-69 Type 18 wedge type, SD2, Hilti TZ (expansion anchors for post-install), ISAT Blue Bangar SDI inserts (for wet-set), or universal concrete inserts.
1. Wedge type shall be constructed of a steel, zinc-plated body with a removable malleable iron nut that accepts threaded rod to 7/8-inch diameter. Wedge design shall allow the insert to be held by concrete in compression to maximize the load carrying capacity. Anvil Figure 281.
 2. Universal type shall be constructed of black malleable iron body with a removable malleable iron nut that accepts threaded rod to 7/8-inch diameter. Anvil Figure 282.
 3. Use drilled steel shell with plug type inserts when the inserts are placed after the concrete is poured.

PART 3 - EXECUTION

3.1 HANGERS AND SUPPORTS

- A. Deflection of pipes shall not exceed 1/240th (0.416 percent) of span. Support horizontal piping in accordance with the schedule indicated on the mechanical plans.
- B. Provide hangers at each change in direction. Place a hanger within 24 inches of each horizontal elbow.
- C. Hangers shall be directly bolted to steel beams of building construction, where they occur. Smaller pipes shall be suspended from crosspieces of pipe or steel angles, which in turn, are securely fastened to building beams or hung from building concrete construction by means of rods and inserts. Provide supports which shall be amply strong and rigid for the load, but which will not weaken or unduly stress the building construction.
- D. Provide approved roller support, floor stands, wall brackets, etc., for lines running near the floor or near walls, which can be properly supported or suspended by the floors or walls. Pipelines near walls may also be hung by hangers carried from approved wall brackets at a higher level than the pipe.
- E. Do not hang piping from supports for other services. Installed supports shall accommodate free expansion of the piping system.
- F. Support copper tubing with approved hangers. Hangers for uncovered lines shall be specially designed for copper tubing and of exact outside diameter of tubing. Hangers for covered tubing shall be broad straps fitting outside of covering.
- G. Hangers for insulated piping:

SUPPORTS, HANGERS, ANCHORS AND SLEEVES 23 05 29 - 3

1. Attach clamps and spacers to piping:
 - a. Piping operating above ambient air temperature: clamp may project through insulation.
 - b. Piping operating below ambient air temperature: use thermal-hanger shield insert with clamp sized to match OD of insert.
- H. For piping 4 inches and larger, support the elbows of the piping adjacent to pumps with steel supports from the concrete housekeeping pad to prevent loading heavy weights of piping on pump flanges or casing.
- I. Adjust hangers to obtain pipe slope where specified.
- J. Where piping can be conveniently grouped to allow the use of trapeze type supports, use standard structural shapes or continuous insert channels for the supporting steel. Where continuous insert channels are used, pipe supporting devices made specifically for use with the channels may be substituted for the specified supporting devices provided that similar types are used, and all data is submitted for prior review.
- K. Perform all welding in accordance with standards of the American Welding Society. Clean surfaces of loose scale, rust, paint, or other foreign matter and properly align before welding. Use wire brush on welds after welding. Welds shall show uniform section, smoothness of weld metal and freedom from porosity and clinkers. Where necessary to achieve smooth connections, joints shall be dressed smooth.

END OF SECTION

SECTION 23 05 48

VIBRATION AND SEISMIC CONTROLS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes but is not limited to:

- 1. Elastomeric isolation.
- 2. Restraining cables.

1.3 SUBMITTALS

- A. Product Data: Include load deflection curves for each vibration isolation device.
- B. Shop Drawings: Signed and sealed by a qualified professional engineer. Include the following:
 - 1. Design Calculations: Calculate requirements for selecting vibration isolators and seismic restraints.
 - 2. Seismic-Restraint Details: Detail fabrication and attachment of seismic restraints and snubbers. Show anchorage details and indicate quantity, diameter, and depth of penetration of anchors,
- C. Welding certificates.
- D. Manufacturer Seismic Qualification Certification: Submit certification that all specified equipment will withstand seismic forces. Include the following:
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculations.
 - 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."
 - 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.

1.4 QUALITY ASSURANCE

- A. Seismic-restraint devices shall have horizontal and vertical load testing and analysis performed and shall bear anchorage pre-approval "OPA" number from OSHPD, preapproval by ICC-ES, or another agency acceptable to DSA, showing the maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If pre-approved

VIBRATION AND SEISMIC CONTROLS FOR HVAC PIPING AND EQUIPMENT 23 05 48 - 1

ratings are not available, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a qualified professional engineer. Testing and calculations must include both shear and tensile loads and 1 test or analysis at 45 degrees to the weakest mode.

- B. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code-Steel."

1.5 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into base. Concrete, reinforcement, and formwork requirements are specified in Division 3.

PART 2 - PRODUCTS

2.1 VIBRATION ISOLATORS

- A. Manufacturers: Mason, Amber/Booth, ISAT or equal.
- B. Elastomeric Isolator Pads (EIP): Oil and water-resistant elastomer or natural rubber, arranged in single or multiple layers, molded with a nonslip pattern and galvanized steel base plates of sufficient stiffness for uniform loading over pad area, and factory cut to sizes that match requirements of supported equipment.
 - 1. Material: Standard Neoprene
 - 2. Durometer Rating: 45
- C. Housed, Restrained Spring Isolator: Two-part telescoping housing with a steel top and bottom frame separated by an elastomeric material and enclosing the spring isolators. Housings are equipped with adjustable snubbers to limit vertical movement. Drilled base housing for bolting to structure with an elastomeric isolator pad attached to the underside. Bases shall limit floor load to 500 psig. Threaded top housing with adjustment bolt and cap screw to fasten and level equipment.
 - 1. Outside Spring Diameter: Not less than 80% of the compressed height of the spring at rated load
 - 2. Minimum Additional Travel: 50% of the required deflection at rated load.
 - 3. Lateral stiffness: More than 80% of rated vertical stiffness.
 - 4. Overload Capacity: Support 200% of rated load, fully compressed, without deformation or failure.
- D. Spring Hangers: Combination Coil-Spring and Elastomeric-Insert Hanger with Spring and Insert in compression.
 - 1. Frame: Steel, fabricated for connection to threaded hanger rods and to allow for a maximum of 30 degrees of angular hanger-rod misalignment without binding or reducing isolation efficiency.
 - 2. Outside Spring Diameter: Not less than 80% of the compressed height of the spring at rated load.
 - 3. Minimum Additional Travel: 50% of the required deflection at rated load.
 - 4. Lateral Stiffness: More than 80% of the of rated vertical stiffness.

5. Overload Capacity: Support 200% of rated load, fully compressed, without deformation or failure.
6. Elastomeric Element: Molded, oil-resistant rubber or neoprene. Steel-washer-reinforced cup to support spring and bushing projecting through the bottom of frame. Self-centering hanger-rod cap to ensure concentricity between hanger rod and support spring coil.

2.2 SEISMIC-RESTRAINT DEVICES

A. Manufacturers:

1. B-Line Systems, Inc.
2. California Dynamics Corp.
3. Kinetics Noise Control, Inc.
4. Mason Industries, Inc.
5. TOLCO Incorporated.
6. Unistrut Diversified Products Co.; Wayne Manufacturing Division.
7. ISAT

B. Resilient Isolation Washers and Bushings (RIWB): one-piece, molded, bridge-bearing neoprene complying with AASHTO M 251 and having a durometer of 50, plus or minus 5, with a flat washer face.

C. Restraint Channel Bracings: Bracing assembly made of slotted steel channels, with accessories for attachment to braced component at one end and to building structure at the other end, and other matching components and with corrosion-resistant coating; rated in tension, compression, and torsion forces.

D. Anchor Bolts (AB): Seismic-rated, drill-in, and stud-wedge or female-wedge type.

1. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488/E 488M.

2.3 FACTORY FINISHES

A. Manufacturer's standard prime coat finish ready for field painting.

B. Finish: Manufacturer's standard paint applied to factory-assembled and tested equipment before shipping.

1. Powder coating on springs and housings.
2. All hardware shall be electro galvanized. Hot dip galvanize metal components for exterior use.
3. Baked enamel for metal components on isolators for interior use.
4. Color-code or otherwise mark vibration Isolation and seismic-control devices to indicate capacity range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and equipment to receive vibration isolation and seismic-control devices for

compliance with requirements, Installation tolerances, and other conditions affecting performance.

- B. Examine roughing-In of reinforcement and cast-In-place anchors to verify actual locations before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install steel angles or channel, sized to prevent buckling, clamped with ductile-iron clamps to hanger rods for trapeze and individual pipe hangers identified as being a required seismic restrain by the seismic structural engineer. At trapeze anchor locations, shackle piping to trapeze. Requirements apply equally to hanging equipment. Do not weld angles to rods.
- B. Install resilient bolt isolation washers on equipment anchor bolts.

3.3 EQUIPMENT BASES

- A. Concrete Bases: Anchor equipment to concrete base in accordance with the DSA-approved structural drawings and specifications.
 - 1. Cast-In-place concrete materials and placement requirements are specified In Division 3.

3.4 FIELD QUALITY CONTROL

- A. Testing: Perform the following field quality-control testing:
 - 1. Isolator seismic-restraint clearance.

3.5 ADJUSTING

- A. Adjust seismic restraints to permit free movement of equipment within normal mode of operation.
- B. Torque anchor bolts according to equipment manufacturer's written recommendations to resist seismic forces.
- C. Adjust isolators after piping systems have been filled and equipment is at operating weight.
- D. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.
- E. Attach thrust limits at centerline of thrust and adjust to a maximum of 1/4-inch movement during start and stop.
- F. Adjust active height of spring isolators.
- G. Adjust snubbers according to manufacturer's written recommendations.
- H. Adjust seismic restraints to permit free movement of equipment within normal mode of

VIBRATION AND SEISMIC CONTROLS FOR HVAC PIPING AND EQUIPMENT 23 05 48 - 4

operation.

- I. Torque anchor bolts according to equipment manufacturer's written recommendations to resist seismic forces.

3.6 CLEANING

- A. After completing equipment installation, inspect vibration isolation and seismic control devices. Remove paint splatters and other spots, dirt, and debris.

END OF SECTION

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SECTION 23 05 53

IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section as fully as if repeated here.

1.2 SUMMARY

- A. This Section includes the following mechanical identification materials and their installation:
 - 1. Equipment nameplates.
 - 2. Equipment signs.
 - 3. Pipe markers.
 - 4. Valve tags.
 - 5. Valve schedules.
 - 6. Warning tags.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Valve Numbering Scheme.
- C. Valve Schedules: Provide valve schedules for each piping system.

1.4 QUALITY ASSURANCE

- A. ASME Compliance: Comply with ASME A13.1, "Scheme for the Identification of Piping Systems," for letter size, length of color field, colors, and viewing angles of identification devices for piping.

1.5 COORDINATION

- A. Coordinate the installation of identifications with the completion of covers, finishes and painting of surfaces where identifications are to be applied.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
 - 1. For Pipe Markers, Nameplates and Valve Tags: Seton, Craftmark, Brady or equal.

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2.2 EQUIPMENT IDENTIFICATION DEVICES

- A. Equipment Nameplates: Metal, with data engraved or stamped, for permanent attachment on the equipment.
 - 1. Data:
 - a. Manufacturer, product name, model number, and serial number.
 - b. Capacity, operating and power characteristics, and essential data.
 - c. Labels of tested compliances.
 - 2. Location: Accessible and visible.
 - 3. Fasteners: As required to mount on equipment.
- B. Equipment Signs: ASTM D 709, Type I, cellulose, paper-base, phenolic-resin-laminate engraving stock; Grade ES-2, black surface, black phenolic core, with white melamine subcore, unless otherwise indicated. Fabricate in sizes required for message. Provide holes for mechanical fastening.
 - 1. Data: Instructions for operation of equipment and for safety procedures.
 - 2. Engraving: Manufacturer's standard letter style, of sizes and with terms to match equipment identification.
 - 3. Thickness: 1/16 inch for units up to 20 sq. in. or 8 inches in length, and 1/8 inch for larger units.
 - 4. Fasteners: Self-tapping, stainless-steel screws or contact-type, permanent adhesive.

2.3 PIPE MARKERS

- A. Manufactured Pipe Markers: Preprinted, color-coded, with lettering indicating service, and showing direction of flow.
 - 1. Colors: Comply with ASME A13.1, unless otherwise indicated.
 - 2. Lettering: Use piping system terms indicated on the drawings. Use abbreviations only as necessary.
 - 3. Pipes with an outside diameter less than 6 inches (including insulation): Full-band pipe markers extending 360 degrees around the pipe at each location.
 - 4. Pipes with an outside diameter 6 inches and larger (including insulation): Either full-band or strip-type pipe markers at least three times letter height and of length required for the label.
 - 5. Arrows: Integral with piping system service lettering to accommodate both directions; or as separate unit on each pipe marker to indicate direction of flow.
- B. Pretensioned Pipe Markers: Pre-coiled semirigid plastic formed to cover full circumference of pipe and to attach to pipe without adhesive.
- C. Shaped Pipe Markers: Preformed semirigid plastic formed to partially cover circumference of pipe and to attach to pipe with mechanical fasteners that do not penetrate insulation vapor barrier.
- D. Self-Adhesive Pipe Markers: Plastic with pressure-sensitive, permanent-type, self-adhesive back.

- E. Plastic Tape: Continuously printed, vinyl tape at least 3-mils thick with pressure-sensitive, permanent-type, self-adhesive back.
 - 1. Width for Markers on Pipes with OD, Including Insulation, less than 6 Inches: 3/4 inch minimum.
 - 2. Width for Markers on Pipes with OD, Including Insulation, 6 Inches or Larger: 1-1/2 inches minimum.

2.4 VALVE TAGS

- A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers, with numbering scheme approved by Architect. Provide 5/32-inch hole for fastener.
 - 1. Material: 0.032-inch- thick brass.
 - 2. Valve-Tag Fasteners: Brass wire-link or beaded chain; or S-hook.

2.5 VALVE SCHEDULES

- A. Valve Schedules: For each piping system, on standard-size bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.
 - 1. Valve-Schedule Frames: Glazed display frame for removable mounting on masonry walls for each page of valve schedule. Include mounting screws.
 - 2. Frame: Extruded aluminum.
 - 3. Glazing: ASTM C 1036, Type I, Class 1, Glazing Quality B, 2.5-mm, single-thickness glass.

2.6 WARNING TAGS

- A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags; of plasticized card stock with a matte finish suitable for writing.
 - 1. Size: 3 by 5-1/4 inches minimum
 - 2. Fasteners: Brass grommet and wire.
 - 3. Nomenclature: Large-size primary captions such as DANGER, CAUTION, or DO NOT OPERATE.
 - 4. Color: Yellow background with black lettering.

PART 3 - EXECUTION

3.1 APPLICATIONS, GENERAL

- A. Products specified are for applications referenced in other Division 23 Sections. If more than single-type material, device, or label is specified for listed applications, selection is installer's option.

3.2 EQUIPMENT IDENTIFICATION

IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT 23 05 53 - 3

- A. Install and permanently fasten equipment nameplates on each major item of mechanical equipment that does not have a manufacturer's nameplate or has a nameplate that is damaged or located where not easily visible. Locate nameplates where accessible and visible.
- B. Install equipment markers with permanent adhesive on or near each major item of mechanical equipment. Data required for markers may be included on signs, and markers may be omitted if both are indicated.
 - 1. Letter Size: Minimum 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
 - 2. Data: Distinguish between multiple units, indicate operational requirements, indicate safety and emergency precautions, warn of hazards and improper operations, and identify units.
 - 3. Locate markers where accessible and visible. Include markers for the following general categories of equipment:
 - a. Main control and operating valves, including safety devices and hazardous units such as gas outlets.
 - b. Meters, gauges, thermometers, and similar units.
 - c. Strainers, filters and similar equipment.
- C. Install equipment signs with screws or permanent adhesive on or near each major item of equipment. Locate signs where accessible and visible.
 - 1. Identify mechanical equipment with equipment markers in the following color codes:
 - a. Green: For cooling equipment and components.
 - b. Yellow: For heating equipment and components.
 - 2. Letter Size: Minimum 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
 - 3. Data: Distinguish between multiple units, indicate operational requirements, indicate safety and emergency precautions, warn of hazards and improper operations, and identify units.
 - 4. Include signs for the following general categories of equipment:
 - a. Main control and operating valves, including safety devices.
 - b. Strainers, filters and similar equipment.

3.3 PIPING IDENTIFICATION

- A. Install manufactured pipe markers indicating service on each piping system. Install with flow indication arrows showing direction of flow.
 - 1. Pipes with outside diameter less than 6 inches (including insulation): Pretensioned pipe markers. Use size to ensure a tight fit.

IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT 23 05 53 - 4

2. Pipes with outside diameter greater than 6 inches (including insulation): Shaped pipe markers. Use size to match pipe and secure with fasteners.
- B. Locate pipe markers and color bands where piping is exposed in exterior non concealed locations.
1. Near each valve and control device.
 2. Near each branch connection, excluding short takeoffs.
 3. Where the flow pattern is not obvious, mark each pipe at branch.
 4. Near penetrations through walls, floors, ceilings, and nonassessable enclosures.
 5. Near major equipment items and other points of origination and termination.
 6. Spaced at maximum intervals of 15 feet along each run.

3.4 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems (except check valves); valves within factory-fabricated equipment units; shutoff valves. List tagged valves in a valve schedule.
- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following:
1. Valve-Tag Size and Shape:
 - a. Hot and Chilled Water: 1-1/2 inches, round.
 2. Valve-Tag Color:
 - a. Heating hot water: Red
 - b. Chilled water: Blue.
 3. Letter Color:
 - a. Hot and Chilled Water: White

3.5 VALVE-SCHEDULE INSTALLATION

- A. Mount the valve schedule on a wall in an accessible location in the utility yard.

3.6 CLEANING

- A. Clean faces of mechanical identification devices and glass frames of valve schedules.

END OF SECTION

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SECTION 230593

TESTING, ADJUSTING, AND BALANCING

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 as fully as if repeated here.

1.2 SUMMARY

- A. Section Includes:
 - 1. Balancing Hydronic Piping Systems:
 - a. Variable-flow hydronic systems.
 - b. Primary-secondary hydronic systems.
 - 2. Testing, Adjusting, and Balancing Equipment:
 - a. Motors.
 - b. Variable frequency drives.
 - c. Pumps.
 - d. Air-cooled chillers.
 - e. Boilers.
 - 3. Control system verification.

1.3 DEFINITIONS

- A. AABC: Associated Air Balance Council.
- B. BAS: Building automation systems.
- C. NEBB: National Environmental Balancing Bureau.
- D. TAB: Testing, adjusting, and balancing.
- E. TABB: Testing, Adjusting, and Balancing Bureau.
- F. TAB Specialist: An independent entity meeting qualifications to perform TAB work.
- G. TDH: Total dynamic head.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: Within 30 days of Contractor's Notice to Proceed, submit the following documentation:
 - 1. Documentation that the TAB specialist and this Project's TAB team members meet the qualifications specified in "Quality Assurance" article.
 - 2. Contract documents examination summary report.
 - 3. Strategies and procedures plan.
 - 4. System readiness checklists.
- B. Certified TAB reports.
- C. Sample report forms.
- D. Instrument calibration reports, to include the following:
 - 1. Instrument type and make.
 - 2. Serial number.
 - 3. Application.
 - 4. Dates of use.
 - 5. Dates of calibration.

1.5 QUALITY ASSURANCE

- A. TAB Specialists Qualifications: Certified by AABC, NEBB, or TABB.
 - 1. TAB Field Supervisor: Employee of the TAB specialist and certified by AABC, NEBB, or TABB.
 - 2. TAB Technician: Employee of the TAB specialist and certified by AABC, NEBB, or TABB as a TAB technician.
- B. Instrumentation Type, Quantity, Accuracy, and Calibration: Comply with requirements in ASHRAE 111, Section 4, "Instrumentation."
- C. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6.7.2.3 - "System Balancing."

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems designs that may preclude proper TAB of systems and equipment.

TESTING, ADJUSTING, AND BALANCING 23 05 93 - 2

- B. Examine installed systems for balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings. Verify that locations of these devices are applicable for intended purpose and are accessible.
- C. Examine the approved submittals for HVAC systems and equipment.
- D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems output, and statements of philosophies and assumptions about HVAC system and equipment controls.
- E. Examine equipment performance data including pump curves.
 - 1. Relate performance data to the project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
 - 2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.
- F. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
- G. Examine test reports specified in individual system and equipment Sections.
- H. Examine HVAC equipment and verify that bearings are greased, filters are clean, and equipment with functioning controls is ready for operation.
- I. Examine strainers. Verify that startup screens have been replaced by permanent screens with indicated perforations.
- J. Examine control valves for proper installation for their intended function of throttling, diverting, or mixing fluid flows.
- K. Examine system pumps to ensure absence of entrained air in the suction piping.
- L. Examine operating safety interlocks and controls on HVAC equipment.
- M. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set-points if different from indicated values.

3.2 PREPARATION

- A. Prepare a TAB plan that includes the following:
 - 1. Equipment and systems to be tested.
 - 2. Strategies and step-by-step procedures for balancing the systems.
 - 3. Instrumentation to be used.
 - 4. Sample forms with specific identification for all equipment.

TESTING, ADJUSTING, AND BALANCING 23 05 93 - 3

- B. Perform a system-readiness check of hydronic systems and equipment to verify system readiness for TAB work. Include, at a minimum, the following:
 - 1. Hydronics:
 - a. Verify leakage and pressure tests on water distribution systems have been satisfactorily completed.
 - b. Piping is complete.
 - c. Water treatment is complete.
 - d. Systems are flushed, filled, and air purged.
 - e. Strainers are pulled and cleaned.
 - f. Control valves are functioning per the sequence of operation.
 - g. Shutoff and balance valves have been verified to be 100 percent open.
 - h. Suitable access to balancing devices and equipment is provided.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance", ASHRAE 111, NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems", SMACNA's "HVAC Systems - Testing, Adjusting, and Balancing" and in this Section.
- B. Mark equipment and balancing devices with paint or other suitable, permanent identification material to show final settings.
- C. Take and report testing and balancing measurements in inch-pound (IP) units.

3.4 GENERAL PROCEDURES FOR HYDRONIC SYSTEMS

- A. Prepare test reports for pumps, boilers and chillers. Obtain approved submittals and manufacturer-recommended testing procedures. Crosscheck the summation of required coil and heat exchanger flow rates with pump design flow rate.
- B. Prepare schematic diagrams of systems' "as-built" piping layouts.
- C. In addition to requirements in "Preparation" Article, prepare hydronic systems for testing and balancing as follows:
 - 1. Check liquid level in expansion tank.
 - 2. Check highest vent for adequate pressure.
 - 3. Check flow-control valves for proper position.
 - 4. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
 - 5. Verify that motor starters are equipped with properly sized thermal protection.
 - 6. Check that air has been purged from the system.

3.5 PROCEDURES FOR VARIABLE-FLOW HYDRONIC SYSTEMS

- A. Balance systems with automatic two- and three-way control valves by setting systems at maximum flow through heat-exchange terminals and proceed as specified above for hydronic systems.
- B. Adjust the variable-flow hydronic system as follows:
 - 1. Verify that the differential-pressure sensor is located as indicated.
 - 2. Determine whether there is diversity in the system.
- C. For systems with diversity:
 - 1. Determine diversity factor.
 - 2. Simulate system diversity by closing required number of control valves, as approved by the design engineer.
 - 3. Adjust pumps to deliver total design gpm.
 - a. Measure total water flow.
 - 1) Position valves for full flow through coils.
 - 2) Measure flow by main flow meter, if installed.
 - 3) If main flow meter is not installed, determine flow by pump TDH or exchanger pressure drop.
 - b. Measure pump TDH as follows:
 - 1) Measure discharge pressure directly at the pump outlet flange or in discharge pipe prior to any valves.
 - 2) Measure inlet pressure directly at the pump inlet flange or in suction pipe prior to any valves or strainers.
 - 3) Convert pressure to head and correct for differences in gage heights.
 - 4) Verify pump impeller size by measuring the TDH with the discharge valve closed. Note the point on manufacturer's pump curve at zero flow and verify that the pump has the intended impeller size.
 - 5) With valves open, read pump TDH. Adjust pump discharge valve until design water flow is achieved.
 - c. Monitor motor performance during procedures and do not operate motor in an overloaded condition.
 - 4. Adjust flow-measuring devices installed in mains and branches to design water flows.
 - a. Measure flow in main and branch pipes.
 - b. Adjust main and branch balance valves for design flow.
 - c. Re-measure each main and branch after all have been adjusted.

5. Adjust flow-measuring devices installed at terminals for each space to design water flows.
 - a. Measure flow at terminals.
 - b. Adjust each terminal to design flow.
 - c. Re-measure each terminal after it is adjusted.
 - d. Position control valves to bypass the coil and adjust the bypass valve to maintain design flow.
 - e. Perform temperature tests after flows have been balanced.
6. For systems with pressure-independent valves at terminals:
 - a. Measure differential pressure and verify that it is within manufacturer's specified range.
 - b. Perform temperature tests after flows have been verified.
7. Open control valves that were shut. Close a sufficient number of control valves that were previously open to maintain diversity, and balance terminals that were just opened.
8. Prior to verifying final system conditions, determine system differential-pressure set point.
9. If the pump discharge valve was used to set total system flow with variable-frequency controller at 60 Hz, at completion open discharge valve 100 percent and allow variable-frequency controller to control system differential-pressure set point. Record pump data under both conditions.
10. Mark final settings and verify that memory stops have been set.
11. Verify final system conditions as follows:
 - a. Re-measure and confirm that total water flow is within design.
 - b. Re-measure final pumps' operating data, TDH, volts, amps, and static profile.
 - c. Mark final settings.
12. Verify that memory stops have been set.

3.6 PROCEDURES FOR PRIMARY-SECONDARY HYDRONIC SYSTEMS (Heating Hot Water System)

- A. Balance the primary circuit flow first.
- B. Balance the secondary circuits after the primary circuits are complete.
- C. Adjust pumps to deliver total design GPM.
 1. Measure total water flow.
 - a. Position valves for full flow through coils.
 - b. Measure flow by main flow meter, if installed.
 - c. If main flow meter is not installed, determine flow by pump TDH or exchanger pressure drop.

2. Measure pump TDH as follows:
 - a. Measure discharge pressure directly at the pump outlet flange or in discharge pipe prior to any valves.
 - b. Measure inlet pressure directly at the pump inlet flange or in suction pipe prior to any valves or strainers.
 - c. Convert pressure to head and correct for differences in gage heights.
 - d. Verify pump impeller size by measuring the TDH with the discharge valve closed. Note the point on manufacturer's pump curve at zero flow and verify that the pump has the intended impeller size.
 - e. With valves open, read pump TDH. Adjust pump discharge valve until design water flow is achieved.
 3. Monitor motor performance during procedures and do not operate motor in an overloaded condition.
- D. Adjust flow-measuring devices installed in mains and branches to design water flows.
1. Measure flow in main and branch pipes.
 2. Adjust main and branch balance valves for design flow.
 3. Re-measure each main and branch after all have been adjusted.
- E. Adjust flow-measuring devices installed at terminals for each space to design water flows.
1. Measure flow at terminals.
 2. Adjust each terminal to design flow.
 3. Re-measure each terminal after it is adjusted.
 4. Position control valves to bypass the coil and adjust the bypass valve to maintain design flow.
 5. Perform temperature tests after flows have been balanced.
- F. For systems with pressure-independent valves at terminals:
1. Measure differential pressure and verify that it is within manufacturer's specified range.
 2. Perform temperature tests after flows have been verified.
- G. Verify final system conditions as follows:
1. Re-measure and confirm that total water flow is within design.
 2. Re-measure final pumps' operating data, TDH, volts, amps, and static profile.
 3. Mark final settings.
- H. Verify that memory stops have been set.

3.7 PROCEDURES FOR BOILERS

A. Hydronic Boilers:

1. Measure and record entering- and leaving-water temperatures.
2. Measure and record water flow.

3. Record relief valve pressure setting.

3.8 PROCEDURES FOR MOTORS

- A. Motors 1/2 HP and Larger: Test at final balanced conditions and record the following data:
 1. Manufacturer's name, model number, and serial number.
 2. Motor horsepower rating.
 3. Motor rpm.
 4. Phase and hertz.
 5. Nameplate and measured voltage, each phase.
 6. Nameplate and measured amperage, each phase.
 7. Starter size and thermal-protection-element rating.
 8. Service factor and frame size.
- B. Motors Driven by Variable-Frequency Controllers: Test manual bypass of controller to prove proper operation.

3.9 PROCEDURES FOR AIR-COOLED CHILLERS

- A. Measure, adjust, and record the following data for each chiller:
 1. Entering- and leaving-water temperature.
 2. Water flow rate.
 3. Water pressure-drop.
 4. Dry-bulb temperature of entering and leaving air.
 5. Wet-bulb temperature of entering and leaving air.

3.10 TOLERANCES

- A. Set HVAC system's airflow rates and water flow rates within the following tolerances:
 1. Supply, Return, and Exhaust Fans and Equipment with Fans: [Plus or minus 10 percent]
 2. Air Outlets and Inlets: [Plus or minus 10 percent]
 3. Heating-Water Flow Rate: [Plus or minus 10 percent]
- B. Maintaining pressure relationships as designed shall have priority over the tolerances specified above.

3.11 PROGRESS REPORTING

- A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems balancing devices. Recommend changes and additions to systems balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

3.12 FINAL REPORT

- A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.
1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
 2. Include a list of instruments used for procedures, along with proof of calibration.
 3. Certify validity and accuracy of field data.
- B. Final Report Contents: In addition to certified field-report data, include the following:
1. Pump curves.
 2. Manufacturers' test data.
 3. Field test reports prepared by system and equipment installers.
 4. Other information relative to equipment performance; do not include Shop Drawings and Product Data.
- C. General Report Data: In addition to form titles and entries, include the following data:
1. Title page.
 2. Name and address of the TAB specialist.
 3. Project name.
 4. Project location.
 5. Architect's name and address.
 6. Engineer's name and address.
 7. Contractor's name and address.
 8. Report date.
 9. Signature of TAB supervisor who certifies the report.
 10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
 11. Summary of contents including the following:
 - a. Indicated versus final performance.
 - b. Notable characteristics of systems.
 - c. Description of system operation sequence if it varies from the Contract Documents.
 12. Nomenclature sheets for each item of equipment.
 13. Data for all equipment, including manufacturer's name, type, size, and fittings.
 14. Notes to explain why certain final data in the body of reports vary from indicated values.
 15. Test conditions for pumps.
- D. System Diagrams: Include schematic layouts of hydronic distribution systems. Present each system with single-line diagram and include the following:
1. Water flow rates.
 2. Pipe and valve sizes and locations.
 3. Balancing stations.

4. Position of balancing devices.

E. Pump Test Reports

1. Unit Data:
 - a. Model number and serial number.
 - b. Water pressure differential in feet of head or psig.
 - c. Required net positive suction head in feet of head or psig.
 - d. Pump rpm.
 - e. Impeller diameter in inches.
 - f. Motor-make and frame size.
 - g. Motor horsepower and rpm.
 - h. Voltage at each connection.
 - i. Amperage for each phase.
 - j. Full-load amperage and service-factor.
 - k. Seal type.
2. Test Data (Design and Actual Values):
 - a. Static head in feet of head or psig.
 - b. Pump shutoff pressure in feet of head or psig.
 - c. Full-open flow rate in GPM.
 - d. Full-open pressure in feet of head or psig.
 - e. Final discharge pressure in feet of head or psig.
 - f. Final suction pressure in feet of head or psig.
 - g. Final total pressure in feet of head or psig.
 - h. Balanced water flow rate in GPM.
 - i. Voltage at each connection.
 - j. Amperage for each phase.

END OF SECTION

SECTION 23 07 19

PIPE AND EQUIPMENT INSULATION

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 as fully as if repeated here.

1.2 SUMMARY

- A. Types of mechanical insulation specified in this Section include the following:
 - 1. Piping system insulation.
- B. Related Work Specified in other sections:
 - 1. Basic installation requirements Section 23 00 00 Basic HVAC Requirements.
 - 2. Insulated pipe supports (pipe shields) and other support and vibration isolation materials are specified in section 23 05 29 Supports, Hangers, Anchors and Sleeves.
 - 3. Identification devices for piping and equipment are specified in Section 23 05 53, Identification for HVAC Piping and Equipment.

1.3 SUBMITTALS

- A. Product Data: Identify thermal conductivity, thickness, and jackets (both factory and field applied, if any), for each type of product indicated.
- B. Installer Certificates: Signed by the Contractor certifying that installers comply with requirements.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the U.S. Department of Labor, Bureau of Apprenticeship and Training.
- B. Fire-Test-Response Characteristics: As determined by testing materials identical to those specified in this section according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and sealer and cement material containers with appropriate markings of applicable testing and inspecting agency.
 - 1. Insulation installed outdoors: Flame-spread rating of 75 or less, and smoke developed rating of 150 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Ship insulation materials in containers marked by the manufacturer with appropriate ASTM specification designation, type and grade, and maximum use temperature.

1.6 COORDINATION

- A. Coordinate the size and location of supports, hangers, and insulation shields.
- B. Coordinate clearance requirements with the piping installer for insulation application.

1.7 SCHEDULING

- A. Schedule the application of insulation products to pipes, valves and equipment after testing the piping systems. Insulation may be applied on pipe segments that have satisfactory test results.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:

1. Mineral-Fiber Insulation:

- a. CertainTeed
- b. Knauf
- c. Owens-Corning

2. Flexible Elastomeric Thermal Insulation:

- a. Armstrong
- b. Rubatex

3. Calcium Silicate Insulation:

- a. Owens-Corning
- b. Pabco
- c. Schuller

2.2 INSULATION MATERIALS

- A. Mineral-Fiber Insulation: Glass fibers bonded with a thermosetting resin complying with the following:
 - 1. Preformed Pipe Insulation: Comply with ASTM C 547, Type 1, with factory applied, all-purpose, vapor-retarder jacket.
 - 2. Blanket Insulation: Comply with ASTM C 553, Type II, without facing.
 - 3. Fire-Resistant Adhesive: Comply with MIL-A-3316C in the following classes and grades:

- a. Class 1, Grade A for bonding glass cloth and tape to un-faced glass-fiber insulation, for sealing edges of glass-fiber insulation, and for bonding lagging cloth to un-faced glass-fiber insulation.
 - b. Class 2, Grade A for bonding glass-fiber Insulation to metal surfaces.
- 4. Mineral-Fiber Insulating Cements: Comply with ASTM C 195.
- 5. Expanded or Exfoliated Vermiculite Insulating Cements: Comply with ASTM C 196.
- 6. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C 449(C 449M).
- B. Flexible Elastomeric Thermal Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.
 - 1. Adhesive: As recommended by the insulation manufacturer.
 - 2. Ultraviolet-Protective Coating: As recommended by insulation manufacturer.
- C. Calcium Silicate Insulation: Preformed pipe sections of noncombustible, inorganic, hydrous calcium silicate with non-asbestos fibrous reinforcement. Comply with ASTM C 533, Type I.
- D. Prefabricated Thermal Insulating Fitting Covers: Comply with ASTM C 450 for dimensions used in performing insulation to cover valves, elbows, tees, and flanges.

2.3 FIELD-APPLIED JACKETS

- A. Stainless Steel Jacket: Install on pipe insulation that will be exposed to weather. Heavy duty, 0.016" thick, sealed weathertight. Secure jacket with 1/2" stainless steel bands at 12" on center.

2.4 ACCESSORIES AND ATTACHMENTS

- A. Glass Cloth and Tape: Comply with UL-C-20079H, Type I for cloth and Type II for tape, Woven glass-fiber fabrics, plain weave, pre-sized a minimum of 8 oz per sq. yd.
 - 1. Tape Width: 4 inches
- B. Bands: 1/2 inch wide, in one of the following materials compatible with jacket:
 - 1. Stainless Steel: ASTM A 666, Type 304; 0.020 Inch thick.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Preparation: Clean and dry pipe and fitting surfaces. Remove materials that will adversely affect insulation application.

3.3 GENERAL APPLICATION REQUIREMENTS

- A. Apply insulation materials, accessories, and finishes according to the manufacturer's written instructions; with smooth, straight, and even surfaces; free of voids throughout the length of piping, including fittings, valves, and specialties.
- B. Refer to schedules at the end of this Section for materials, forms, Jackets, and thicknesses required for each piping system.
- C. Use accessories compatible with insulation materials. Use accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Apply insulation with longitudinal seams at top and bottom of horizontal pipe runs.
- E. Apply multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Seal joints and seams with vapor-retarder mastic on insulation indicated to receive a vapor retarder.
- H. Keep insulation materials dry during application and finishing.
- I. Apply insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesives recommended by the insulation material manufacturer.
- J. Apply insulation with the least number of joints practical.
- K. Apply insulation over fittings, valves, and specialties, with continuous thermal and vapor-retarder integrity, unless otherwise indicated. Refer to special instructions for applying insulation over fittings, valves, and specialties.
- L. Hangers and Anchors: Where vapor retarder is indicated, seal penetrations in insulation at hangers, supports, anchors, and other projections with vapor-retarder mastic.
 - 1. Attach clamps and spacers to piping:
 - a. Piping operating above ambient air temperature: clamp may project through insulation.
 - b. Piping operating below ambient air temperature: use thermal-hanger shield insert with clamp sized to match outside diameter of insert.
 - 2. For insulation application where vapor retarders are indicated, extend insulation on anchor legs at least 12 inches from point of attachment to pipe and taper insulation ends. Seal tapered ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.

3. Install insert materials and apply insulation to tightly join the insert. Seal insulation-to-insulation inserts with adhesive or sealing compound recommended by the insulation material manufacturer.
 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect the jacket from tears or puncture by the hanger, support, and shield.
- M. Insulation Terminations: For insulation application where vapor retarders are indicated, taper insulation ends. Seal tapered ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.
- N. Apply adhesives and mastics at the manufacturer's recommended coverage rate.
- O. Apply insulation with integral jackets as follows:
1. Pull jacket tight and smooth.
 2. Circumferential Joints: Cover with 3-inch-wide strips of the same material as the insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip and spaced 4 inches on-center.
 3. Longitudinal Seams: Overlap jacket seams at least 1-1/2 inches. Apply insulation with longitudinal seams at the bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along the edge at 4 inches on-center.
 - a. Exception: Do not staple longitudinal laps on insulation products having a vapor retarder.
 4. Vapor-Retarder Mastics: Apply mastic on seams and joints and at ends adjacent to flanges, unions, valves, and fittings.
 5. At penetrations in jackets for thermometers and pressure gages, fill and seal voids with vapor-retarder mastic.

3.4 MINERAL-FIBER INSULATION APPLICATION

- A. Apply insulation to straight pipes and tubes as follows:
1. Secure each layer of preformed pipe insulation to pipe with wire, tape, or bands without deforming insulation materials.
 2. Seal longitudinal seams and end joints with vapor-retarder mastic. Apply vapor retarder to ends of insulation at intervals of 15 feet to form a vapor retarder between pipe insulation segments.
 3. For insulation with factory-applied jackets, secure laps with outward clinched staples at 6 inches on-center.
 4. For insulation with factory-applied jackets with vapor retarders, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by the insulation material manufacturer and seal with vapor-retarder mastic.
- B. Apply insulation to flanges as follows:
1. Apply preformed pipe insulation to outer diameter of pipe flange.
 2. Make width of insulation segment the same as overall width of the flange and bolts, plus twice the thickness of the pipe insulation.

3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Apply canvas jacket material with manufacturer's recommended adhesive, overlapping seams at least 1-inch and seal joints with vapor-retarder mastic.
5. Cover insulation with pre-formed stainless steel flange covers.

C. Apply insulation to fittings and elbows as follows:

1. Apply pre-molded insulation sections segments of pipe insulation in accordance with manufacturer's written instructions.
2. When pre-molded insulation elbows and fittings are not available, apply mitered sections of pipe insulation, or glass-fiber blanket insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire, tape, or bands.
3. Cover fittings with standard PVC fitting covers.
4. Overlap PVC covers on pipe insulation jackets at least 1-inch at each end. Secure fitting covers with manufacturer's attachments and accessories. Seal seams with tape and vapor-retarder mastic.

D. Apply insulation to valves and specialties as follows:

1. Apply pre molded insulation sections segments of pipe insulation when manufacturer's written instructions of the same material as straight available.
2. When pre-molded insulation sections are not available, apply glass-fiber blanket insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation. For check valves, arrange insulation for access to strainer basket without disturbing insulation.
3. Apply insulation to flanges as specified for flange insulation application.
4. Use preformed standard PVC fitting covers for valve sizes where available. Secure fitting covers with manufacturer's attachments and accessories. Seal seams with tape and vapor-retarder mastic.
5. For larger sizes where PVC fitting covers are not available, seal insulation with canvas jacket and sealing compound recommended by the insulation material manufacturer.

3.5 FINISHES

- A. Flexible Elastomeric Thermal Insulation: After the adhesive has fully cured, apply two coats of the insulation manufacturer's recommended protective coating.
- B. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.

3.6 PIPING SYSTEM APPLICATIONS

- A. Insulation materials and thicknesses are specified in schedules at the end of this Section.
- B. Items Not Insulated: Unless otherwise indicated, do not apply insulation to the following systems, materials, and equipment:
 1. Flexible connectors.
 2. Vibration-control devices.
 3. Drainage piping located in crawl spaces, unless otherwise indicated.

4. Below-grade piping, unless otherwise indicated.
5. Air chambers, unions, strainers, check valves, plug valves, and flow regulators.
6. Vertical sections of rainwater leaders.

3.7 FIELD QUALITY CONTROL

- A. Inspection: Perform field quality-control inspections, after installing insulation materials, jackets, and finishes to determine compliance with requirements. Repair or reinstall defective insulation products.

3.8 INSULATION APPLICATION SCHEDULE, GENERAL

- A. Refer to insulation schedules on mechanical plans.

END OF SECTION

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SECTION 23 08 10

SYSTEMS STARTUP AND COMMISSIONING

PART 1 - GENERAL

1.1. WORK INCLUDED

- A. This Section specifies the requirements for prebalance, startup, and commissioning of mechanical systems, including, but not limited to:
 - 1) Chilled water systems.
 - 2) Heating water systems.
- B. Requirements for the following are included:
 - 1) HVAC systems prebalancing.
 - 2) HVAC systems manual run.
 - 3) HVAC systems balancing.
 - 4) HVAC control system testing.
 - 5) HVAC systems, commissioning.
 - 6) HVAC systems 72-hour acceptance test.

1.2. QUALITY ASSURANCE

- A. ASHRAE Guideline 1, The HVAC Commissioning Process.

1.3. DEFINITIONS

- A. HVAC systems commissioning consists of the following:
 - 1) Verify operation and functional performance of HVAC systems for compliance with design documents.
 - 2) Document tests and inspections.
 - 3) Verify application of operation and maintenance manuals, as-built (record) documents, spare parts listing, special tools listing, and other items as may be specified herein for support of HVAC systems and equipment.
 - 4) Coordinate and direct training to personnel for operation and maintenance of HVAC equipment and systems.

1.4. DOCUMENTATION

- A. The contractor shall prepare and have ready the following documents at the start of commissioning:
 - 1) Project plans and specifications (Subcontract documents), authorized revisions, HVAC shop drawings and submittals (approved), test and balance reports, equipment startup and certification reports, etc.
 - 2) Records of required code authority inspections documentation signoff, etc.

PART 2 - PRODUCTS

2.1 INSTRUMENTATION

- A. Instrumentation shall be provided and operated by the Subcontractor.

PART 3 – EXECUTION

3.1 GENERAL

- A. Subcontractor personnel involved in commissioning shall actively participate in the construction phase of the project to ensure compliance with HVAC commissioning requirements.

3.2 PROCEDURE

- A. Attend the preconstruction meeting and establish requirements for HVAC commissioning authority process throughout construction phase.
- B. Prepare and submit to Contractor an HVAC commissioning plan.
- C. Commissioning team shall periodically attend construction and coordination meetings.

3.3 HVAC SYSTEMS PREBALANCE

- A. Subcontractor shall perform the following work for pre-balancing of all hydronic systems:
 - 1) Prior to completion of the piping systems, the mechanical contractor shall coordinate and fully cooperate with the balancing subcontractor. All drawings shall be checked and any balancing valves, or devices not shown on the drawings, but necessary for proper balance as determined by the balancing subcontractor, shall be added or relocated. After completion of the piping systems, the balancing subcontractors shall certify that the systems have been checked and that all devices are installed to facilitate the balancing work.
 - 2) Complete all piping pressure testing as specified.
 - 3) Complete all punch list items which may affect balancing.
 - 4) Remove all shipping and storage protection; remove shipping locks from vibration isolators and clean debris from under all isolated equipment.
 - 5) Check all motors for rotation. Log RPM, voltage, and amps.
 - 6) Check starter heater sizes for conformance with motor nameplate data.
 - 7) Install temporary construction filters as required.
 - 8) Fully open all automatic control valves.
 - 9) Lubricate all equipment per manufacturer's recommendations and provide access to lubrication fittings as required.
 - 10) Align all pumps and ensure that bases are grouted as required; check alignment of all flexible pump connectors.
 - 11) Flush clean all piping systems from debris. Treat piping systems with chemicals, if required.
 - 12) Fill, bleed, and charge with chemicals all piping systems.

SYSTEMS STARTUP AND COMMISSIONING 23 08 10 - 2

3.4 HVAC SYSTEMS MANUAL RUN

- A. Upon completion of the preparation work, perform the following:
 - 1) Charge and start chillers, boilers, pumps, and all other major pieces of equipment. Manufacturer's representatives shall perform the startup of all major equipment. Setting all operating and limit equipment controls shall also be by manufacturer's representative. Log all settings and furnish a startup report for each piece of equipment.
 - 2) Operate all equipment manually (in the LOCAL or HAND mode) for a minimum of 2 consecutive 8-hour days. All variable frequency drives shall be set to HAND or MANUAL with the output set at 100 percent. Repair or replace any piece of equipment which fails during this period and restart the test from the beginning.
 - 3) After such time as all systems have been successfully operated for the 2-day period, the balancing subcontractor may begin work.
 - 4) At the completion of the manual run, remove all startup strainers. Clean all permanent strainers. Replace temporary filters and/or clean permanent filters. Make all systems ready for full-time operation.

3.5 HVAC SYSTEMS BALANCING

- A. Testing, adjusting and balancing work is specified in Section 23 05 93.

3.6 HVAC CONTROL SYSTEM TESTING

- A. The control system testing requires that the controls subcontractor, with assistance from the contractor as necessary, perform a complete checkout and verification of the proper operation and calibration of all system points, sequences, interlocks with associated systems and loop functions. The purpose of this phase of work is to place the system into automatic operation in preparation for verification of the mechanical and controls system operation by the 72-hour system acceptance test.
- B. The testing phase will consist of the following steps:
 - 1) Field testing and verification (loop checks).
 - 2) Performance verification.
- C. Tests are conducted by the controls subcontractor. Verify accurate wiring for sensors, valves, switches, relays, and control panels.
- D. Test all sequences of operation specified and identified in the drawings and specifications. Calibrate all sensors, transmitters, controllers, and actuators to achieve setpoint tolerances for all control loops.

3.7 HVAC SYSTEMS COMMISSIONING

- A. HVAC systems commissioning shall begin after the prebalance, manual run, testing, adjusting and balancing and control system testing is complete.
- B. Verify water balancing readings.
- C. Verify calibration of sensors, instruments, valve positions and related controls.

- D. Verify readings of remote data and control systems, such as variable frequency drive settings.
- E. Verify that the chilled and hot water systems are performing to provide conditions outlined in design documents.

3.8 MECHANICAL AND ELECTRICAL 72-HOUR SYSTEMS ACCEPTANCE TEST

- A. Perform a fully automatic, concurrent test of the completed chilled and hot water systems to demonstrate that they will function reliably and in accordance with the design documents, for an uninterrupted period of 72 hours, continuously.
- B. Maintain trend logs of equipment operation, pump speeds, water temperatures, and water flow rates during the test.
- C. All systems shall function in a completely automatic mode to maintain design conditions without any equipment shutdown or malfunction.
- D. Any shutdown, malfunction, or deviation from design sequences during the 72-hour test will be cause to discontinue the test and restart from the beginning after faults are corrected.

END OF SECTION

SECTION 23 09 00

INSTRUMENTATION AND CONTROL

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Furnish a native BACnet Energy Management System (EMS) as specified herein. The operator's workstation, all building controllers, application controllers, and all input/output devices shall communicate using the protocols and network standards as defined by ANSI/ASHRAE Standard 135-2016, BACnet. In other words, all workstations and controllers, including unitary controllers, shall be native BACnet devices. No gateways shall be used for communication to controllers installed under this section. Gateways may be used for communication to existing systems or to systems installed under other sections.
- B. The native BACnet EMS shall be as specified herein and consist of a high-speed, peer-to-peer local area network of DDC controllers connected to a dedicated Server PC and other client workstation PC's and Lap Top computers as specified. All HVAC and/or Electrical system points monitored and controlled by the EMS, including the building floor plans as well as all control devices, will be depicted by point-and-click graphics.
- C. Provide all necessary BACnet-compliant hardware and software to meet the system's functional specifications. Provide Protocol Implementation Conformance Statement (PICS) for Windows-based control software and every controller in system, including unitary controllers. All controller devices must be BTL tested and listed by the official BACnet Testing Laboratory, having the BTL approval mark issued with Rev 15 or later listing for the MS/TP devices.
- D. All devices in this new project facility location shall be accessible from a single graphical user interface.
- E. Prepare individual hardware layouts, interconnection drawings, and software configuration from project design data.
- F. Design, provide, and install all equipment cabinets, panels, data communication network cables needed, and all associated hardware.
- G. Furnish and install the required software to produce a complete and operational native BACnet EMS as specified herein.
- H. Provide complete manufacturer's specifications for all items that are supplied. Include vendor name of every item supplied.
- I. Provide a comprehensive operator and technician training program as described herein.
- J. Provide as-built documentation, operator's terminal software, diagrams, and all other associated project operational documentation (such as technical manuals) on approved media, the sum total of which accurately represents the final system.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Products Supplied but Not Installed Under This Section:
 - 1. Wells, sockets and inline hardware for water sensors (temperature, pressure, flow).
 - 2. Chilled water flow meters governing primary-only pump operation.

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- B. Products Installed but Not Supplied Under This Section: None.
- C. Products Not Furnished or Installed but Integrated with the Work of This Section:
 - 1. Chiller control systems.
 - 2. Boiler control systems.
 - 3. Pump control packages.
 - 4. Variable Frequency Drives
- D. Work Required Under Other Divisions Related to This Section:
 - 1. Power wiring to line side of motor starters, disconnects or variable frequency drives.

1.3 SPECIFICATION NOMENCLATURE AND DEFINITIONS

- A. Acronyms Used in this Specification:
 - 1. Actuator: Device that opens or closes valve or damper in response to control signal.
 - 2. Analog: Continuously variable state over stated range of values.
 - 3. AWS: Advance Workstation
 - 4. BAS: Building Automation System.
 - 5. DDC: Direct Digital Control.
 - 6. HVAC: Heating, Ventilating and Air Conditioning.
 - 7. LAN: Local Area Network.
 - 8. Modulating: Movement of control device through a range of values, proportional to an infinitely variable input value.
 - 9. Motorized: Control device with actuator.
 - 10. Operator Workstation: PC running the control system software and any required software tools applicable for day to day operation of the BMS.
 - 11. PICS: BACnet Product Interoperability Compliance Statement.
 - 12. PID: Proportional-Integral-Derivative control, control mode with continuous correction of final controller output element versus input signal based on proportional error, its time history (reset) and rate at which it's changing (derivative).
 - 13. Point: Analog or discrete instrument with addressable database value.
 - 14. WAN: Wide Area Network.

1.4 SYSTEM DESCRIPTION

- A. A distributed logic control system complete with all software and hardware functions shall be provided and installed. System shall be completely based on ANSI/ASHRAE Standard 135-2016, BACnet and achieved listing under the BACnet Testing Laboratories BACnet - Advanced Workstation Software (B-AWS). This system is to control all mechanical equipment, including all unitary equipment such as boilers, chillers, variable frequency drives, and pumps, and any other listed equipment using native BACnet-compliant components. Non-BACnet-compliant or proprietary equipment or systems (including gateways) shall not be acceptable and are specifically prohibited.
- B. Operator's workstation is existing. Tie in new equipment to Antioch Unified School District existing BMS server.
- C. The control system shall include energy management software, including scheduling and chilled and hot water control strategies with optimum start and logging routines. All energy management software and firmware shall be resident in field hardware and shall not be dependent on the operator's terminal. Operator's terminal software is to be used for access to field-based energy management functions only. Provide temperature, scheduling, runtime accumulation, equipment

alarm reporting, and override timers for after-hours usage.

- D. All application controllers for all central plant equipment shall be fully programmable. Application controllers shall be mounted next to controlled equipment and communicate with the existing building controller through BACnet LAN.
- E. System Architecture
 - 1. Connection between all Integration Level Global Controllers, the BACnet Server and any client workstations (PC's or Lap Tops) shall be high-speed, peer-to-peer Ethernet as per Standard IEEE802.3. Owner shall furnish and maintain IT WAN infrastructure.
 - 2. EMS Contractor shall provide and install a dedicated MS/TP LAN extending from all Global Controller's to distributed field level controller BACnet devices.
 - 3. Distributed field level controllers are responsible for directly controlling and monitoring HVAC and Electrical system points for this project.
 - 4. The BACnet Server hosts system configurations, programming databases and stores all trend log data. The Server maintains all backup files for system configuration and programming located on Global Controller's and field level controllers and is capable of directly uploading or downloading information from the controllers.
 - 5. An existing operator's workstation and/or any designated portable operator's terminal (if specified) shall be used as a graphical user interface to provide system supervision, management report generation and alarm annunciation.

1.5 APPROVED MANUFACTURERS

- A. Approved Control Manufacturers:
 - 1. Alerton – Ascent Compass; no substitution – Contact Obehi Okoiye-Moore at Syserco: 510-495-4976 or e-mail: o.okoiye@syserco.com for further bid coordination.
 - 2. No Equals.
- B. Owner and Owner's Representative reserves the right to approve and/or deny qualification status of all potential bidders based upon references and compliance with Specifications and Contract Documents.

1.6 QUALITY ASSURANCE

- A. The Contractor shall be regularly engaged in the manufacturing, installation and maintenance of EMS systems and shall have demonstrated technical expertise and experience in the manufacture, installation and maintenance of EMS systems similar in size and complexity to this project.
- B. The EMS system shall be designed, installed, commissioned, and serviced by manufacturer-authorized and trained personnel. System provider shall have an in-place support facility within 50 miles of the site with technical staff, spare parts inventory and necessary test and diagnostic equipment.
- C. To provide the level of support and response required by the Owner, the Energy Management System Contractor shall have a fully staffed service. 24/7 Service Call Center staffed by live operators enabling immediate response to Owner's needs.
- D. EMS Contractor shall have a proven record of successful native BACnet installations and maintenance of equivalent native BACnet systems for a minimum period of 5 years utilizing the same native BACnet manufacturer's product line that the Contractor proposes to use on this project.
- E. Materials and equipment shall be manufacturer's latest standard design that complies with the specification requirements.
- F. All BAS peer-to-peer network controllers, central system controllers and local user displays shall

be UL Listed under Standard UL 916, category PAZX.

- G. All electronic equipment shall conform to the requirements of FCC Regulation, Part 15, Governing Radio Frequency Electromagnetic Interference and be so labeled.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Store and handle in strict compliance with manufacturer's written instruction and recommendations.
- B. Protect from damage due to weather, excessive temperature and construction operations.

1.8 REFERENCE STANDARDS

- A. The latest edition of the following standards and codes in effect and amended as of supplier's proposal date, and any applicable subsections thereof, shall govern design and selection of equipment and material supplied:
 - 1. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE).
 - 2. ANSI/ASHRAE Standard 135-2016, BACnet.
 - 3. California Building Code (CBC), including local amendments.
 - 4. UL 916 Underwriters Laboratories Standard for Energy Management Equipment. Canada and the US.
 - 5. National Electrical Code (NEC).
 - 6. FCC Part 15, Subpart J, Class A.
 - 7. EMC Directive 89/336/EEC (European CE Mark).
- B. City, county, state, and federal regulations and codes in effect as of contract date.
- C. Except as otherwise indicated, the system supplier shall secure and pay for all permits, inspections, and certifications required for his work, and arrange for necessary approvals by the governing authorities.

1.9 SUBMITTALS

- A. Drawings
 - 1. The system supplier shall submit engineered drawings, control sequence, and bill of materials for approval.
 - 2. Drawings shall be submitted in the following standard sizes: 11" x 17" (ANSI B).
 - 3. Eight (8) complete sets (copies) of submittal drawings shall be provided.
 - 4. Drawings shall be available on CD-ROM.

- B. System Documentation

Include the following in submittal package:

- 1. System configuration diagrams in simplified block format.
- 2. All input/output object listings and an alarm point summary listing.
- 3. Electrical drawings that show all system internal and external connection points, terminal block layouts, and terminal identification.
- 4. Complete bill of materials, valve schedule and damper schedule.
- 5. Manufacturer's instructions and drawings for installation, maintenance, and operation of all purchased items.
- 6. Overall system operation and maintenance instructions—including preventive maintenance and troubleshooting instructions.
- 7. For all system elements—operator's workstation(s), building controller(s), application controllers, routers, and repeaters—provide BACnet Protocol Implementation Conformance Statements (PICS) as per ANSI/ASHRAE Standard 135-2016.

8. Provide complete description and documentation of any proprietary (non-BACnet) services and/or objects used in the system.
9. A list of all functions available and a sample of function block programming that shall be part of the delivered system.

1.10 WARRANTY

- A. Warranty shall cover all costs for parts, labor, associated travel, and expenses for a period of one (1) year from completion of system acceptance.
- B. Extended Warranty – Years 2 to 5. For Characterized Control Valves (CCV), Globe Valves, Butterfly Valves, associated Valve Actuators and Damper Actuators, provide like kind replacement components for any defective material identified and returned in Years 2 to 5 from the date of production.
- C. Hardware and software personnel supporting this warranty agreement shall provide on-site or off-site service in a timely manner after failure notification to the vendor.
- D. This warranty shall apply equally to both hardware and software.

1.11 RELATED WORK IN OTHER SECTIONS

- A. Refer to Division 0 and Division 1 for related contractual requirements.
- B. Refer to Section 23 00 00 for General Mechanical Provisions.
- C. Refer to Section 26 00 00 for General Electrical Provisions.

PART 2 - PRODUCTS

2.1 OPERATORS WORKSTATION – (Existing at District Office)

- A. General structure of workstation interaction shall be a standard client/server relationship. Server shall be used to archive data and store system database for the BACnet network as specified in these contract document Specifications and project Plan Drawings. Thick and Web Clients shall access server for all archived data. Server shall support a minimum of 20 simultaneous clients.
- B. BACnet Conformance
 1. Operator workstation shall be approved by the BTL as meeting the BACnet Advanced Workstation (AWS) requirements.
 2. Please refer to Section 22.2, BACnet Functional Groups, in the BACnet standard, for a complete list of the services that must be directly supported to provide each of the functional groups listed above. All proprietary services, if used in the system, shall be thoroughly documented and provided as part of the submittal data. All necessary tools shall be supplied for working with proprietary information.
 3. Standard BACnet object types accessed by the workstation shall include as a minimum: Analog Value, Analog Input, Analog Output, Binary Value, Binary Input, Binary Output, Calendar, Device, Event Enrollment, File, Notification Class, Program, and Schedule object types. All proprietary object types, if used in the system, shall be thoroughly documented and provided as part of the submittal data. All necessary tools shall be supplied for working with proprietary information.
 4. The AWS shall comply with Annex J of the BACnet specification for IP connections. Must support remote connection to server using a thick client application. This device shall use Ethernet to connect to the IP internetwork, while using the same Ethernet LAN for non-IP communications to other BACnet devices on the LAN. Must support interoperability on wide area networks (WANs) and campus area networks (CANs). Workstation shall support

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Foreign Device Registration to allow temporary workstation connection to IP network.

C. Data Displays

1. Data displays shall render all data associated with project as called out on drawings and/or object type list supplied. Graphic files shall be created using digital, full color photographs of system installation, AutoCAD or Visio drawing files of field installation drawings and wiring diagrams from as-built drawings.
2. Data displays shall render all data using iconic graphic representations of all mechanical equipment. System shall be capable of displaying graphic file, text, and dynamic object data together on each display and shall include animation. Information shall be labeled with descriptors and shall be shown with the appropriate engineering units. All information on any display shall be dynamically updated without any action by the user.
3. Data display frame shall allow user to change all field-resident AWS functions associated with the project, such as setpoints, weekly schedules, exception schedules, etc., from any screen, no matter if that screen shows all text or a complete graphic display. This shall be done without any reference to object addresses or other numeric/mnemonic indications.
4. Analog objects shall be displayed with operator modifiable units. Analog input objects may also be displayed as individual graphic items on the display screen as an overlay to the system graphic.
5. All displays and programming shall be generated and customized by the local EMS Contractor. Systems requiring factory development of graphics or programming of DDC logic are specifically prohibited.
6. AWS shall be supplied with a library of standard graphics, which may be used unaltered or modified by the operator. AWS shall include a library of equipment graphic components to assemble custom graphics. Systems that do not allow customization or creation of new graphic objects by the operator (or with third-party software) shall not be allowed.
7. Data display frame shall include customizable and persistent tree navigation for building, equipment and system diagnostic centric display organization.
8. Each display may be protected from viewing unless operator credentials have the appropriate access level. An access level may be assigned to each display and system object. The menu label shall not appear on the graphic if the operator does not have the appropriate security level.
9. Data displays shall have the ability to link to content outside of the BAS system. Such content shall include but is not limited to: Launching external files in their native applications (for example, a Microsoft Word document) and launching a Web browser resolving to a specified Web address.
10. Data displays shall support:
 - a. Graphic items with custom geometry that offer both color gradient shading and variable opacity in scale to system variables and range set points.
 - b. Clear and custom geometry navigation buttons to provide intuitive navigation.
 - c. Graphic files in jpg, png, and .gif file types.
 - d. Viewing of 1,024 system data points in a single screen.
11. All graphical user interface screens developed for Thick or Web Client devices on this project shall be seamlessly integrated to the existing Alerton Ascent Compass Server PC by the EMS Contractor. Graphical user interface screens for this project requiring software enabling/support beyond Alerton Ascent Compass are specifically prohibited.

D. Password Protection

1. Provide security system that prevents unauthorized use unless operator is logged on. Access shall be limited to operator's assigned functions when user is logged on. This includes displays as outlined above.
2. AWS shall provide security for a minimum of 200 users. Each user shall have an individual

User ID, User Name, and Password. Entries are alphanumeric characters only and are case sensitive (except for User ID). User ID shall be 0–8 characters, User Name shall be 0–29 characters, and Password shall be 4–8 characters long.

3. Each user shall be allowed individual assignment of only those control functions, menu items, and user specific system start display, as well restricted access to *discrete BACnet devices* to which that user requires access.
4. All passwords, user names, and access assignments shall be adjustable online at the operator's terminal.
5. Users shall also have a set access level, which defines access to displays and individual objects the user may control. System shall include 10 separate and distinct access levels for assignment to users.
6. System shall include an Auto Logout Feature that shall automatically logout user when there has been no keyboard or mouse activity for a set period of time. Time period shall be adjustable by system administrator. Auto Logout may be enabled and disabled by system administrator. Operator terminal shall display message on screen that user is logged out after Auto Logout occurs.
7. The system shall permit the assignment of an effective date range, as well as an effective time of day, that the User IDs are permitted to authenticate.

E. Operator Activity Log

1. Operator Activity Log that tracks all operator changes and activities shall be included with AWS. System shall track what is changed in the system, who performed this change, date and time of system activity, and value of the change before and after operator activity. Operator shall be able to display all activity, sort the changes by user and also by operation. Operator shall be able to print the Operator Activity log display.
2. Log shall be gathered and archived to hard drive on AWS as needed. Operator shall be able to export data for display and sorting in a spreadsheet.
3. User option to enter a comment in Operator Activity Log upon system point change. Option to enforce user comment in order to complete system point change.
4. Operator Activity Log is accessible via right mouse click and selection from web client context menu.

F. Scheduling

1. AWS and Web Client shall show all information in easy-to-read daily format including calendar of this month and next. All schedules shall show actual ON/OFF times for day based on scheduling priority. Priority for scheduling shall be events, holidays and daily, with events being the highest.
2. Holiday and special event schedules shall display data in calendar format. Operator shall be able to schedule holidays and special events directly from these calendars.
3. Operator shall be able to change all information for a given weekly or exception schedule if logged on with the appropriate access privileges.
4. AWS shall include a Schedule Wizard for set up of schedules. Wizard shall walk user through all steps necessary for schedule generation. Wizard shall have its own pull-down selection for startup or may be started by right-clicking on value displayed on graphic and then selecting Schedule.
5. Scheduling shall include optimum start based on outside air temperature, current heating/cooling setpoints, indoor temperature and history of previous starts. Each and every individual zone shall have optimum start time independently calculated based on all parameters listed. User shall input schedules to set time that occupied setpoint is to be attained. Optimum start feature shall calculate the startup time needed to match zone temperature to setpoint. User shall be able to set a limit for the maximum startup time allowed.

6. Schedule list shall show all schedules currently defined. This list shall include all standard, holiday and event schedules. In addition, user shall be able to select a list that shows all scheduled points and zones.
7. Display of all three schedules must show all ON times for standard, holiday and event schedules in different colors on a given day. In addition, OFF times for each must also be shown in additional colors. User shall be able to select from standard calendar what days are to be scheduled and same display shall show all points and zones affected. User shall be able to set time for one day and select all days of the week that shall be affected as a recurrence of that same schedule for that given day.
8. Any displayed data that is changeable by the operator may be selected using the right mouse button and the schedule shall then be selectable on the screen. Selection of the schedule using this method shall allow the viewing of the assigned schedule allow the point to be scheduled.
9. Schedule editor shall support Drag-n-drop events and holidays onto the schedule calendar.
10. Schedule editor shall support Drag-n-drop events default to a 2hr period; which can then be adjusted by the user.
11. Schedule editor shall support Drag-n-drop holidays are defaulted for OFF all day and can be edited for multiple-day holidays.
12. Schedule editor shall support the View of affected zones when adding or editing timed events of a schedule.

G. Advanced Scheduling:

1. Hierarchy of schedulable resources shall be customized to meet owner/operator specific scheduling needs and requirements.
2. Schedulable resources shall support analog and binary data points, e.g. AV, AO, BV, BO objects.
3. Each schedulable resource shall have its own unique schedule object.
4. Holiday schedules shall support definition of a specific date or a perpetual holiday with a duration, for example the USA Thanksgiving two-day holiday.
5. Calendar events set to be reoccurring events shall support the following recurrence patterns:
 - a. Repeat daily every x days or every weekday
 - b. Repeat weekly every x weeks on selected days of the week
 - c. Repeat monthly every x months on a specific date of the month or a specific day such third Saturday or last Monday.
 - d. Repeat yearly every x years on a specific month and date or a specified day of a specified month, e.g. last Wednesday of November
6. Calendar events set to be reoccurring events shall support the following recurrence ranges: no end date, end after x occurrences, and end by a specified date.
7. Calendar events set to be reoccurring events shall support a custom recurrence setting that is a collection of specified random dates that may have no logical pattern.
8. Calendar events shall be configurable as a template that allows quick reuse and application by drag-and-drop onto any resource calendar. Any event shall be capable of being made into an event template.
9. Calendar events shall require the following parameters: Event Name, Event Type (binary or setpoint), Start Date/Time, and End Date/Time.
 - a. Analog Event Type shall support selecting setpoint type to ensure that only compatible analog points are scheduled with a specified value
10. Calendar Events shall support selection of schedulable resources by inheritance to all child resources or by selection of specific resources. Each selected resource shall support setting

a start and end offset of +/- 6 hours from event start start/end times.

11. The following conflict resolution rules shall be provided to determine what to do when schedulable resources have two events scheduled for the same time: Local vs. Inherited event; On vs. Off event; Newest vs. oldest event.

H. Alarm Management

1. AOWS shall provide visual, printed, and email means of alarm indication. Printout of alarms shall be sent to the assigned network printer. Alarm notification can be filtered based on the User ID's authorization level.
2. Alarm Manager shall provide log of alarm messages. History of alarm occurrences shall be archived to the data storage of the AOWS or a SQL data base. Each entry shall include a description of the event-initiating object generating the alarm. Description shall be an alarm message of at least 256 characters in length. Entry shall include time and date of alarm occurrence, time and date of object state return to normal, time and date of alarm acknowledgment, identification of operator acknowledging alarm, a comment from the operator who acknowledged the alarm, and the number of alarm occurrences.
3. Alarm Manager shall provide a means to filter all alarms that have been configured in the system for alarm description, current alarm state, default and customer date range, disabled/enabled, and priority level.
4. Alarm Manager shall provide a means to disable alarms for the purpose of performing maintenance without creating concern with unneeded alarm notifications.
5. Alarm messages shall be in user-definable text (English or other specified language) and shall be delivered either to the AOWS user interface or through remote communication using email (Authenticated SMTP supported).
6. Alarm Manager shall provide the permissioned ability to Clear alarm occurrences from the Alarm Manager table while retaining the alarm in the AOWS database for reporting purposes.
7. Alarm Manager shall provide the permissioned ability to Purge alarm occurrences from the both the Alarm Manager table and the AOWS database.
8. Alarm Manager shall provide a user customizable navigation link from the Alarm message to the data display or template to the equipment associated with the alarm.
9. Alarm Manager shall provide a context menu that will allow for navigation to Schedule, Trendlog, Object Property display, or System (user) Activity from the Alarm points live data value.
10. AOWS shall include an Alarm Wizard for set up of alarms. Wizard shall walk user through all steps necessary for alarm generation. Wizard shall have its own pull-down selection for startup or may be started by right-clicking on value displayed on graphic and then selecting alarm setup.
11. User can silence audible annunciation for the current session.
12. User can disable auto-refresh of alarm annunciation for current session.
13. Any displayed data that is changeable by the operator may be selected using the right mouse button and the alarm shall then be selectable on the screen. Selection of the alarm using this method shall allow the viewing of the alarm history or allow the creation of a new alarm.
14. Alarm Priority Levels (0-127) shall be definable in number and name. Alarms can be assigned to any of the priority levels defined.
15. The following Alarm data shall be displayed in the Alarm Management User Interface for each alarm:
 - a. Number of times the alarm has occurred
 - b. Average alarm duration (hours, minutes, and seconds) for the following transitions:

- i. Active to Normal
 - ii. Active to Acknowledgement
 - iii. Acknowledgement to Normal
 - c. Actual alarm duration (hours, minutes, and seconds) for the following transitions for each alarm occurrence:
 - i. Active to Normal
 - ii. Active to Acknowledgement
 - iii. Acknowledgement to Normal
 - d. Live data point of point alarmed
 - e. Navigation link to a user-selected display or URL
- 16. User Comment text shall be entered upon acknowledgement of an Alarm. The comment history is stored in the system data base and a user cannot edit or delete a comment after it has been submitted in the system.
- 17. Alarm Performance: An alarm annunciation shall appear on the AOWS user interface within 8 seconds and appear in the Alarm manager and data base within 10 seconds of a triggered alarm.

I. Trend log Information

1. AWS shall periodically gather historically recorded data stored in the building controllers and store the information in the system database. Stored records shall be appended with new sample data, allowing records to be accumulated. Systems that write over stored records shall not be allowed unless limited file size is specified. System database shall be capable of storing up to 50 million records before needing to archive data. Samples may be viewed at the web client. Operator shall be able to view all trended records, both stored and archived. All trend log records shall be displayed in standard engineering units.
2. AWS shall be capable of trending on an interval determined by a polling rate, or change-of-value.
3. AWS shall be able to change Trend log setup information. This includes the information to be logged as well as the interval at which it is to be logged. All operations shall be password protected. Viewing may be accessed directly from any and all graphics on which a trended object is displayed.
4. AWS shall include a Trend log Wizard for setup of logs. Wizard shall walk user through all necessary steps. Wizard shall have its own pull-down selection for startup, or may be started by right-clicking on value displayed on graphic, and then selecting Trend logs from the displayed menu.
5. AWS shall be capable of using Microsoft SQL as the system database.
6. Any displayed data that is changeable by the operator may be selected using the right mouse button and the trend log shall then be selectable on the screen. Selection of the trend log using this method shall allow the viewing of the trend log view.
7. Trend log viewer shall provide:
 - a. Software that is capable of graphing the trend logged object data shall be included.
 - b. Access and ability to create, edit and view are restricted to users by user account credentials
 - c. Specific and repeatable URL defines the trend log(s) that comprise the view
 - d. Call out of trend log value at intersection of trend line and mouse-over vertical axis.
 - e. Trend log and companion logs can be configured to display on one of two independent vertical scales.
 - f. Click zoom for control of data set viewed along either graph axis.
 - g. User specifiable start and end dates as well as a fast scroll features that that

supports click zoom of macro scale view of the data for quickly finding data set based on visual signature.

- h. User export of the viewed data set to MS Excel.
- i. Web browser based help
- j. Optional min/max ranges (Upper Control Limits, Lower Control Limits) for each value.

J. Energy Log Information – As Scheduled

1. AWS shall be capable of periodically gathering energy log data stored in the field equipment and archive the information. Archive files shall be appended with new data, allowing data to be accumulated. Systems that write over archived data shall not be allowed unless limited file size is specified. Display all energy log information in standard engineering units.
2. All data shall be stored in database file format for direct use by third-party programs. Operation of system shall stay completely online during all graphing operations.
3. AWS Operator shall be able to change the energy log setup information as well. This includes the meters to be logged, meter pulse value, and the type of energy units to be logged. All meters monitored by the system may be logged. System shall support using flow and temperature sensors for BTU monitoring.
4. AWS shall display archived data in tabular format form for both consumption and peak values. Data shall be shown in hourly, daily, weekly, monthly and yearly formats. In each format, the user shall be able to select a specific period of data to view.

K. Demand Limiting – As Scheduled

1. AWS shall include demand limiting program that includes two types of load shedding. One type of load shedding shall shed/restore equipment in binary fashion based on energy usage when compared to shed and restore settings. The other type of shedding shall adjust operator selected control setpoints in an analog fashion based on energy usage when compared to shed and restore settings. Shedding may be implemented independently on each and every zone or piece of equipment connected to system.
2. Binary shedding shall include minimum of five (5) priority levels of equipment shedding. All loads in a given priority level shall be shed before any loads in a higher priority level are shed. Load shedding within a given priority level shall include two methods. In one, the loads shall be shed/restored in a “first off-first on” mode, and in the other the loads are just shed/restored in a “first off-last on” (linear) fashion.
3. Analog shed program shall generate a ramp that is independently used by each individual zone or individual control algorithm to raise the appropriate cooling setting and lower appropriate heating setting to reduce energy usage.
4. AWS shall be able to display the status of each and every load shed program. Status of each load assigned to an individual shed program shall be displayed along with English description of each load.

L. Reports

1. AWS shall be capable of periodically producing reports of trend logs, alarm history, tenant activities, device summary, energy logs, and override points. The frequency, content, and delivery are to be user adjustable.
2. All reports shall be capable of being delivered in multiple formats including text- and comma-separated value (CSV) files. The files can be printed, emailed, or saved to a folder, either on the server hard drive or on any network drive location.

M. Configuration/Setup

1. Provide means for operator to display and change system configuration. This shall include, but not be limited to, system time, day of the week, date of daylight savings set forward/set

back, printer termination, port addresses, modem port and speed, etc. Items shall be modified using understandable terminology with simple mouse/cursor key movements.

N. Field Engineering Tools

1. AWS shall include field engineering tools for programming all controllers supplied. All controllers shall be programmed using graphical tools that allow the user to connect function blocks on screen that provide sequencing of all control logic. Function blocks shall be represented by graphical displays that are easily identified and distinct from other types of blocks. Graphical programming that uses simple rectangles and squares is not acceptable.
2. User shall be able to select a graphical function block from menu and place on screen. Provide zoom in and zoom out capabilities. Function blocks shall be downloaded to controller without any reentry of data.
3. Programming tools shall include a real-time operation mode. Function blocks shall display real-time data and be animated to show status of data inputs and outputs when in real-time operation. Animation shall show change of status on logic devices and countdown of timer devices in graphical format.
4. Field engineering tools shall also include a database manager of applications that include logic files for controllers and associated graphics. Operator shall be able to select unit type, input/output configuration and other items that define unit to be controlled. Supply minimum of 250 applications as part of workstation software.
5. Field engineering tool shall include Device Manager for detection of devices connected anywhere on the BACnet network by scanning of the entire network. This function shall display device instance, network identification, model number, and description of connected devices. It shall record and display software file loaded into each controller. A copy of each file shall be stored on the computer's hard drive. If needed, this file shall be downloaded to the appropriate controller using the mouse.
6. AWS automatically notify the user when a device that is not in the database is added to the network.
7. AWS shall include backup/restore function that will back up entire system to selected medium and then restore system from that media. The system shall be capable of creating a backup for the purpose of instantiating a new client PC.
8. The system shall provide a means to scan, detect, interrogate, and edit third-party BACnet devices and BACnet objects within those devices.

O. Workstation Hardware is existing.

P. Software

9. Alerton Compass Software is existing.

Q. WEB Client

1. BAS supplier shall provide an HTML5 based browser access to the AWS as part of standard installation. User must be able to access all displays of real-time data that are part of the AWS using a standard Web browser. Web browser shall tie into the network through owner-supplied Ethernet network connection. The AWS must be able to support 20 concurrent web client users at a minimum.
2. Browser shall be latest version of Microsoft Edge, Firefox and Chrome. No special vendor-supplied software shall be needed on computers running browser. Data shall be displayed in real-time and update automatically without user interaction.
3. Web pages shall be automatically generated using HTML 5 from the data display files that reside on the AWS. Any system that requires use of an HTML editor for generation of Web pages shall not be considered.
4. Access through web client or thick client shall utilize the same hierarchical security scheme

as the AWS. User shall be asked to log on once the client makes connection to the AWS. Once the user logs in, any and all changes that are made shall be tracked by the AWS. The user shall be able to change only those items he or she has authority to change. A user activity report shall show any and all activity of the users who have logged in to the system, regardless of whether those changes were made using a web client, thick client or through the AWS.

R. Graphic Based Displays: For each system.

1. Operator Workstation: Point data for each system. Update every 30 seconds.
2. Dynamically update data any action by user.
3. Graphic Displays: Iconic graphic representations of mechanical equipment. Display graphic files, text, trendlog, and dynamic object data displays including animation.
4. Graphic Displays: "Drill Down" capability from main display to more specific system displays or navigations tree for building equipment and system diagnostic centric display organization.
5. Tree Navigation Contents: Customizable per-user and per-group basis.
6. Systems with Terminal Unit Controls: Building floor plan with dynamic temperatures, drillable for more specific terminal information.
7. Points on graphics allow user to change field-resident Operator Workstation functions associated with project, including setpoints, weekly and exception schedules, from any screen, whether screen shows text or graphic display. Do without reference to object addresses or other numeric/mnemonic indications.
8. Protect display views unless operator credentials have proper access level. Assign access levels to each display/system object. Menu labels not to appear on graphic if operator does not have appropriate security level.
9. Analog objects: Displayed with operator modifiable units. Input objects may be displayed as graphic items on display screen as an overlay to the system graphic.
10. Information: Labeled with descriptors and shown with appropriate engineering units.
11. DDCs system must provide graphic displays and files. Systems requiring graphics development or logic programming are prohibited. Graphic Files: JPG, GIF or PNG.
12. Submit graphic displays to Owner for review and approval. Approved graphics to be in place prior to commissioning.
13. Operator Workstation: Supply graphics library, to use unaltered or modified. Include library to assemble custom graphics. System to allow creation of new graphics.
14. Data Displays: Ability to link to content outside of BAS system. Content to include, but not limited to launching external files in their native applications.

S. Portable Operator's Terminal. Provide all necessary software to configure an IBM-compatible laptop computer for use as a Portable Operator's Terminal. Operator shall be able to connect configured Terminal to the system network or directly to each controller for programming, setting up, and troubleshooting.

2.2 CONTROL PROGRAMMING SOFTWARE

- A. All DDC programming throughout the EMS network shall adhere to the following standards:
1. Programming on all controllers must be completely operator definable and modifiable and must use a single common programming language for all control devices. Use of pre-canned, factory burned-in DDC programming on controllers is not acceptable and is grounds for rejection of EMS system.
 2. Programming shall be developed in an object-oriented graphical programming

environment. Line by line code programming is specifically prohibited and is not acceptable.

3. Programming must accommodate all written sequences of operations.
4. Programming shall be modifiable from any server PC, operator console PC and/or portable laptop PC workstation without requiring the burning of new chips or having to directly access the local controller. Software shall accommodate the downloading of programming via established network Ethernet or modem connections.
5. Programming must support the use of virtual software points in the same manner as all physical points are supported.
6. All programming points, virtual or real, for any specific device in the entire EMS network shall be accessible to all other network devices at any given time, regardless of physical location.
7. All programming shall adhere to the BACnet protocols for Standard Command Priorities.
8. Programming software must include a pre-developed cohesive PID (proportional-integral-derivative) algorithm whereby a user can adjust gain and anti-windup coefficients accordingly to effectively accomplish advanced sequence of operation requirements.

2.3 BUILDING (GLOBAL) CONTROLLER

A. General Requirements

1. BACnet Conformance
 - a. Building Controller shall be approved by the BTL as meeting the BACnet Building Controller requirements.
 - b. Please refer to section 22.2, BACnet Functional Groups, in the BACnet standard, for a complete list of the services that must be directly supported to provide each of the functional groups listed above. All proprietary services, if used in the system, shall be thoroughly documented and provided as part of the submittal data. All necessary tools shall be supplied for working with proprietary information.
2. Building controller shall be of scalable design such that the number of trunks and protocols may be selected to fit the specific requirements of a given project.
3. The controller shall be capable of panel-mounted on DIN rail and/or mounting screws.
4. The controller shall be capable of providing global control strategies for the system based on information from any objects in the system, regardless if the object is directly monitored by the building controller module or by another controller.
5. The controller shall be capable of running up to six independent control strategies simultaneously. The modification of one control strategy does not interrupt the function or runtime others.
6. The software program implementing the DDC strategies shall be completely flexible and user-definable. All software tools necessary for programming shall be provided as part of project software. Any systems utilizing factory pre-programmed global strategies that cannot be modified by field personnel on-site, using a WAN or downloaded through remote communications are not acceptable. Changing global strategies using firmware changes is also unacceptable.
7. Programming shall be object-oriented using control function blocks, and support DDC functions. All flowcharts shall be generated and automatically downloaded to controller. Programming tool shall be supplied and be resident on workstation. The same tool shall be used for all controllers.
8. Programming tool shall provide means to graphically view inputs and outputs to each program block in real-time as program is executing. This function may be performed using the operator's workstation or field computer.

9. Controller shall have 6000 Analog Values and 6000 Binary Values
10. Controller IP configuration can be done via a direct USB connect with an operator's workstation or field computer.
11. Controller shall have at a minimum a Quad Core 996Ghz processor to ensure fast processing speeds.
12. Global control algorithms and automated control functions shall execute using a 64-bit processor.
13. Controller shall have a minimum of 1 GB of DDR3 SDRAM on a 533Mhz bus to ensure high speed data recording, large data storage capacity and reliability.
14. Controller shall support two on-board EIA-485 ports capable of supporting various EIA-485 protocols including but not limited to BACnet MS/TP and Modbus.
15. Controller shall support two additional EIA-485 option cards, each providing two EIA-485 ports capable of supporting various EIA-485 protocols including but not limited to BACnet MS/TP and Modbus
16. Controller shall support two gigabit speed Ethernet (10/100/1000) ports.
 - a. Ports are capable of supporting various Ethernet protocols including but not limited to BACnetIP, FOX, and Modbus.
17. All ports shall be capable of having protocol(s) assigned to utilize the port's physical connection
18. The controller shall have at a minimum four onboard inputs, two universal inputs and two binary inputs.
19. Schedules
 - a. Building controller modules shall provide normal seven-day scheduling, holiday scheduling and event scheduling.
 - b. Each building controller shall support a minimum of 384 BACnet Schedule Objects and 384 BACnet Calendar Objects.
20. Logging Capabilities
 - a. Each building controller shall log as minimum 1920 objects at 15 min intervals. Any object in the system (real or calculated) may be logged. Sample time interval shall be adjustable at the operator's workstation.
 - b. Logs may be viewed both on-site or off-site using WAN or remote communication.
 - c. Building controller shall periodically upload trended data to networked operator's workstation for long-term archiving if desired.
 - d. Archived data stored in database format shall be available for use in third-party spreadsheet or database programs.
21. Alarm Generation
 - a. Alarms may be generated within the system for any object change of value or state (either real or calculated). This includes things such as analog object value changes, binary object state changes, and various controller communication failures.
 - b. Each alarm may be dialed out as noted elsewhere.
 - c. Alarm log shall be provided for alarm viewing. Log may be viewed on-site at the operator's terminal or off-site using remote communications.
 - d. Controller must be able to handle up to 1920 alarm setups stored as BACnet event enrollment objects, with system destination and actions individually configurable.
22. Demand Limiting
 - a. Demand limiting of energy shall be a built-in, user-configurable function. Each controller module shall support shedding of up to 1200 loads using a minimum of two types of shed programs. Each building controller shall support up to 10

- unique demand limiting program modules
- b. Load shedding programs in building controller modules shall operate as defined in section 2.1.J of this specification.

23. Tenant Activity Logging

- a. Tenant Activity logging shall be supported by building controller module. Each independent module shall support a minimum of 384 zones.
- b. Tenant Activity logging shall function as defined in section 2.1.K of this specification.

B. BACnet MS/TP

- 1. BACnet MS/TP LAN must be software-configurable from 9.6 to 115.4Kbps
 - a. Each BACnet MS/TP LAN shall support 64 BACnet devices at a minimum
 - b. All proprietary object types, if used in the system, shall be thoroughly documented and provided as part of the submittal data. All necessary tools shall be supplied for working with proprietary information.

C. BACnet IP

- 1. The building controller shall comply with Annex J of the BACnet specification for IP connections. This device shall use Ethernet to connect to the IP internetwork, while using the same Ethernet LAN for non-IP communications to other BACnet devices on the LAN.
- 2. Must support communications using BACnet/IPv4 and/or BACnet/IPv6
- 3. Must support interoperability on WANs and CANs and function as a BACnet Broadcast Management Device (BBMD).
- 4. Each controller shall support at a minimum 128 BBMD entries
- 5. BBMD management architecture shall support 3000 subnets at a minimum
- 6. Shall support BACnet Network Address Translation
- 7. All proprietary object types, if used in the system, shall be thoroughly documented and provided as part of the submittal data. All necessary tools shall be supplied for working with proprietary information.

D. Expansion ports

- 1. Controller shall support two expansion ports.
 - a. Combining the two on-board EIA-458 ports with fully loaded expansion ports the controller shall support (6) EIA-485 trunks simultaneously
- 2. Expansion cards that mate to the expansion ports shall include:
 - a. Dual port EIA-485 card and EIA-232 card

E. Modbus Protocol Support:

- 1. Controller shall support reading from and writing to TCP Slaves and Serial Connections (RTU or ASCII over either EIA-485 or EIA-232).
 - a. Shall be capable of mapping Modbus register coil data to BACnet AV, BV, MV, AI, BI, and MI object types.
 - b. Support a minimum of 6000 Mapped Modbus points.
- 2. Support up to 384 virtual groupings of Modbus points where each grouping is represented as a single virtual BACnet device.
 - a. Virtual BACnet devices support BACnet Change Of Value (COV) notifications
 - b. Each Virtual device has diagnostic information for troubleshooting Modbus point mapping. Diagnostic point should include the following.
 - i. Number of points mapped.
 - ii. Number of messages Transmitted and Received.
 - iii. Modbus Exception Counts.
 - iv. Display of last exception message.

- v. Serial Setting (Baud rate, Parity, Stop Bits).
- 3. Integration Performance: Data age of integrated point shall be capable of 1 second for 5000 points.
- F. Power Supply
 - 1. Input for power shall accept between 17–30VAC, 47–63Hz.
 - 2. Optional rechargeable battery for shutdown of controller including storage of all data in flash memory
 - 3. On-board capacitor will ensure continuous operation of real-time clocks for minimum of 14 days.
- G. Controller shall be in compliance with the following
 - 1. UL 916 for open energy management
 - 2. FCC Class B
 - 3. ROHS
 - 4. IEC 60703
 - 5. C-Tick Listed
 - 6. CE (EN 60730-1)
- H. Controller shall operate in the following environmental conditions:
 - 1. -4 to 149 °F (-20 to 65 °C) without optional battery, or 32 to 122 °F (0 to 50 °C) with optional battery
 - 2. 0 to 95% RH, non-condensing.

2.4 ADVANCED APPLICATION CONTROLLERS

- A. Provide one or more native BACnet advanced application controllers for HVAC equipment requiring DDC standalone control independent of building control module operation. All controllers shall interface to building controller through either MS/TP LAN using BACnet protocol, or Ethernet LAN using BACnet over Ethernet or BACnet TCP/IP. No gateways shall be used. Controllers shall include input, output and self-contained logic program as needed for complete control of units. Controllers shall be fully programmable using graphical programming blocks. Programming tool shall be resident on operator workstation and be the same tool as used for the building controller. No auxiliary or non-BACnet controllers shall be used.
- B. BACnet Conformance
 - 1. Application controllers shall be approved by the BTL as meeting the BACnet Application Specific Controller requirements.
 - 2. Please refer to section 22.2, BACnet Functional Groups, in the BACnet standard, for a complete list of the services that must be directly supported to provide each of the functional groups listed above. All proprietary services, if used in the system, shall be thoroughly documented and provided as part of the submittal data. All necessary tools shall be supplied for working with proprietary information.
 - 3. Standard BACnet object types supported shall include, as a minimum, Analog Input, Analog Output, Analog Value, Binary Input, Binary Output, Binary Value, Multi-state Values, Device, File, and Program object types. All proprietary object types, if used in the system, shall be thoroughly documented and provided as part of the submittal data. All necessary tools shall be supplied for working with proprietary information.
- C. Application controllers shall include universal inputs with 12-bit resolution that accept 3K and 10K thermistors, 0–10VDC, Platinum 1000 Ohm RTD, 0–5VDC, 4–20mA and dry contact signals. Any input on a controller may be either analog or digital with a minimum of three (3) inputs that accept pulses. Controller shall also include support and modifiable programming for interface to intelligent room sensor with digital display. Controller shall include binary and analog outputs on board.

Analog outputs with 10-bit resolution shall support either 0–10VDC or 0–20mA. Binary outputs shall have LED indication of status. Software shall include scaling features for analog outputs. Application controller shall include 20VDC voltage supply for use as power supply to external sensors.

1. All outputs must have on-board Hand-Off-Auto (HOA) switches and a status indicator light. HOA switch position shall be monitored. Each analog output shall include a potentiometer for manually adjusting the output when the HOA switch is in the Hand position. The position of each and every HOA switch shall be available system wide as a BACnet object property.
- D. All program sequences shall be stored on board application controller in EEPROM. No batteries shall be needed to retain logic program. All program sequences shall be executed by controller up to 20 times per second (minimum of 10 times per second) and capable of multiple PID loops for control of multiple devices. All calculations shall be completed using floating-point math and system shall support display of all information in floating-point nomenclature at operator's terminal.
1. The following control blocks shall be supported:
 - a. Natural Log
 - b. Exponential
 - c. Log base 10
 - d. X to the power of Y
 - e. Nth square root of X
 - f. 5th Order Polynomial Equations
 - g. Astronomical Clock (sunrise/sunset calculation)
 - h. Time-based schedules
- E. Programming of application controller shall be completely modifiable in the field over installed BACnet LANs or remotely using modem interface. Operator shall program logic sequences by graphically moving function blocks on screen and tying blocks together on screen. Application controller shall be programmed using programming tools as described in operator's terminal section.
- F. Application controller shall include support for intelligent room sensor (see Section 2.9.B.) Display on intelligent room sensor shall be programmable at application controller and include an operating mode and a field service mode. All button functions and display data shall be programmable to show specific controller data in each mode, based on which button is pressed on the sensor. See sequence of operation for specific display requirements at intelligent room sensor.
- G. Schedules
1. The controller shall support a minimum of three (3) BACnet Schedule Objects and have a real-time clock on board with battery backup to maintain time through a power loss.
- H. Logging Capabilities
1. Controller shall support a minimum of 50 trend logs. Any object in the controller (real or calculated) may be logged. Sample time interval shall be adjustable at the operator's workstation.
 2. Controller shall periodically upload trended data to system server for long-term archiving if desired. fsArchived data stored in (MS Jet Database or SQL) database form and shall be available for use in third-party spreadsheet or database programs.
- I. Alarm Generation
1. Alarms may be generated within the controller for any object change of value or state (either real or calculated). This includes things such as analog object value changes, and binary object state changes.

2. Alarm log shall be provided for alarm viewing. Log may be viewed on-site at the operator's terminal or off-site using remote communications.
 3. Controller must be able to handle up to 25 alarm setups stored as BACnet event enrollment objects, with system destination and actions individually configurable.
- J. The controller processor shall be a 64-bit processor.
- K. The packaging of the controller shall provide operable doors to cover the terminals once installation is complete. The housing of the controller shall provide for DIN rail mounting and also fully enclose circuit board.

2.5 APPLICATION SPECIFIC CONTROLLERS

- A. Provide one or more native BACnet application controller for HVAC equipment requiring DDC standalone control independent of building control module operation and for each piece of unitary mechanical equipment that adequately covers all objects listed in object list for unit. All controllers shall interface to building controller through MS/TP LAN using BACnet protocol. No gateways shall be used. Controllers shall include input, output and self-contained logic program as needed for complete control of unit.
- B. BACnet Conformance
1. Application controllers shall, as a minimum, support MS/TP BACnet LAN types. They shall communicate directly using this BACnet LAN at 9.6, 19.2, 38.4, 76.8, and 115.2 Kbps, as a native BACnet device. Application controllers shall be approved by the BTL as meeting the BACnet Application Specific Controller requirements and support all BACnet services necessary to provide the following BACnet functional groups:
 - a. Files Functional Group
 - b. Reinitialize Functional Group
 - c. Device Communications Functional Group
 2. Please refer to Section 22.2, BACnet Functional Groups in the BACnet standard, for a complete list of the services that must be directly supported to provide each of the functional groups listed above. All proprietary services, if used in the system, shall be thoroughly documented and provided as part of the submittal data. All necessary tools shall be supplied for working with proprietary information.
 3. Standard BACnet object types supported shall include, as a minimum, Analog Input, Analog Output, Analog Value, Binary Input, Binary Output, Binary Value, Device, File, and Program Object Types. All proprietary object types, if used in the system, shall be thoroughly documented and provided as part of the submittal data. All necessary tools shall be supplied for working with proprietary information.
- C. Application controllers shall include universal inputs with 16-bit resolution that can accept 3K and 10K thermistors, 0–5VDC, 4–20mA, dry contact signals and a minimum of three (3) pulse inputs. Any input on controller may be either analog or digital. Controller shall also include support and modifiable programming for interface to intelligent room sensor. Controller shall include binary outputs on board with analog outputs as needed.
- D. All program sequences shall be stored on board controller in EEPROM. No batteries shall be needed to retain logic program. All program sequences shall be executed by controller 10 times per second and shall be capable of multiple PID loops for control of multiple devices. Programming of application controller shall be completely modifiable in the field over installed BACnet LANs or remotely through modem interface. Operator shall program logic sequences by graphically moving function blocks on screen and tying blocks together on screen. Application controller shall be programmed using same programming tools as building controller and as described in operator

workstation section. All programming tools shall be provided and installed as part of system.

- E. Application controller shall include support for intelligent room sensor (see Section 2.9.B.) Display on room sensor shall be programmable at controller and include an operating mode and a field service mode. All button functions and display data shall be programmable to show specific controller data in each mode based on which button is pressed on the sensor. See sequence of operation for specific display requirements at intelligent room sensor.

2.6 AUXILIARY CONTROL DEVICES

F. Sensors

4. Liquid Immersion Temperature:

| | |
|-------------------------------|--------------------------------------|
| Manufacturer | ACI or Equal |
| Model | TS-21XX-MH-10-AA |
| Thermowell | A/MXX (machined stainless steel) |
| Calibration Adjustments | N/A |
| Temperature monitoring range | 32°F to 158°F |
| Output signal | Changing resistance (10K Ω) |
| Accuracy at Calibration point | $\pm 0.36^\circ\text{F}$ (+/- 0.2°C) |

5. Outside air temperature:

| | |
|-------------------------------|--------------------------------------|
| Manufacturer | Dwyer or Equal |
| Model | TE-RND-B |
| Calibration Adjustments | N/A |
| Temperature monitoring range | 0°F to 150°F |
| Output signal | Changing resistance (10K Ω) |
| Accuracy at Calibration point | $\pm 0.4^\circ\text{F}$ (+/- 0.22°C) |

G. Pressure & Differential Pressure Sensors

1. Liquid Pressure and Differential Pressure Transmitters

| | |
|-------------------------|---------------------------|
| Manufacturer | Veris, ACI or Equal |
| Model | PW2 / A/WPR2-100 or Equal |
| Enclosure | NEMA4 |
| Output | 4 – 20 mA |
| Calibration Adjustments | Zero |
| Accuracy | $\pm 1\%$ Full Scale |

H. Water Flow Meter

1. General

- Flow sensor and signal converter shall be sold as a package by the same manufacturer.
- Install with isolation valves immediately upstream and downstream of meter. If isolation valves are by others, DDC Contractor shall coordinate installation with installing Trade. If hot-tapping an operating hydronic system, provide hot-tap isolation valve instead.
- Install sensor in a location that provides sufficient lengths of straight pipe upstream and downstream of meter. Follow all manufacturer recommendations. If sufficient straight pipe is not available, notify Engineer

- of Record.
 - d. All I/O points shown as hardwired on Building Automation Drawings must be hardwired. Points shown as networked may be transmitted as BACnet objects via network, or as hardwired I/O points.
 - e. UL listed.
- 2. Magnetic, Insertion Type (High Accuracy)
 - a. Application: required for all central plant applications, closed and open loop.
 - b. Flow Sensor
 - i. Insertion electromagnetic flow sensor
 - ii. Meter shall have at least two sets of electrodes, with the flow reading based on the average across all electrodes.
 - iii. Stainless steel or Hastelloy C electrodes
 - iv. No moving parts
 - c. Signal Converter/Transmitter
 - i. Adjustable zero and span
 - ii. Hardwired I/O (where required, see control schematics): 0-10 V or 4-20 mA output for flow
 - d. Performance
 - i. Flow velocity range: 0.1 – 20 FPS
 - ii. Accuracy shall be $\pm 1\%$ of actual reading from 2 to 20 FPS flow velocity.
 - iii. Accuracy shall be maintained over a turndown ratio of at least 200:1.
 - iv. NIST traceable factory calibration performed on accredited water flow test rig.
 - e. Manufacturers: Onicon F-3500 or equal
- 3. Performance:
 - a. $\pm 1\%$ of reading over 25:1 turndown
 - b. $\pm 2\%$ of reading over 100:1 turndown
 - c. Minimum measurable flow: 500:1 turndown
 - d. Repeatability: $\leq \pm 0.2\%$
 - e. NIST traceable factory calibration performed on accredited water flow test rig.
 - f. Manufacturers: Onicon F-4600 and no known equal

I. Switches and Status Indicators

- 1. Differential Pressure Switch
 - a. Diaphragm with adjustable setpoint and adjustable differential.
 - b. Snap-acting Form C contacts rated for the application.
 - c. For water, switch must tolerate differential pressure up to 60 PSI.
 - d. For air, provide with manufacturer's recommended static pressure sensing tips.
 - e. Provide with status indicator point to BAS.
- 2. Current Switch
 - a. Solid-core or split-core
 - b. Range as required by application
 - c. Adjustable trip point
 - d. Switch:
 - i. Solid state
 - ii. Normally open
 - iii. Relay output: minimum 120 VAC or VDC, 0.3 Amps.
 - iv. Zero off state leakage
 - e. Low Frequency Limit: 6 Hz

- f. LED trip indicator
- g. UL and CSA approved
- h. May be used to start other devices if so indicated on Building Automation Drawings.
- i. Manufacturers Veris Industries or Equal

2.7 ELECTRONIC ACTUATORS AND VALVES

A. Quality Assurance for Actuators and Valves

- 1. UL Listed Standard 873 and C.S.A. Class 4813 02 certified.
- 2. NEMA 2 rated enclosures for inside mounting, provide with weather shield for outside mounting.
- 3. Five-year manufacturer's warranty. Two-year unconditional and three-year product defect from date of installation.

B. Actuators for control valves up to 6 inches shall be electric unless otherwise specified, provide actuators as follows:

- 1. UL Listed Standard 873 and Canadian Standards Association Class 481302 shall certify actuators.
- 2. NEMA 2 rated actuator enclosures for inside mounting. Use additional weather shield to protect actuator when mounted outside.
- 3. Five-year manufacturer's warranty. Two-year unconditional and three-year product defect from date of installation.
- 4. Fail safe shall be provided when specified. Capacitors or spring return.
- 5. Position indicator device shall be installed and made visible to the exposed side of the actuator. For damper short shaft mounting, a separate indicator shall be provided to the exposed side of the actuator.
- 6. Overload Protection: Actuators shall provide protection against actuator burnout by using an internal current limiting circuit or digital motor rotation sensing circuit. Circuit shall insure that actuators cannot burn out due to stalled damper or mechanical and electrical paralleling. End switches to deactivate the actuator at the end of rotation are acceptable only for butterfly valve actuators.
- 7. A pushbutton gearbox release shall be provided for all non-spring actuators.
- 8. Modulating actuators shall be 24 VAC and consume 10 VA power or less.
- 9. Conduit connectors are required when specified and when code requires it.

C. Valve Actuators up to 6 inches

- 1. All zone service actuators shall be non-spring return unless otherwise specified.
- 2. The valve actuator shall be capable of providing the minimum torque required for proper valve close-off for the required application.
- 3. All control valves actuators shall have an attached 3-foot cable for easy installation to a junction box.
- 4. Override handle and gearbox release shall be provided for all non-spring return valve actuators.

D. Butterfly valves

- 1. Butterfly valves shall be sized for modulating service at 60–70 degree stem rotation. Isolation valves shall be line-size. Design velocity shall be less than 12 feet per second when used with standard EPDM seats.
 - a. Body is cast iron with powder coat finish.
 - b. Disc is 304 stainless steel.
 - c. Seat is EPDM standard.
 - d. Body Pressure is consistent with ANSI class 125 (200 PSI for valves 1-12

inches at -20–150 degrees F. Different body pressure for larger valves and/or at higher temperatures).

- e. Flange is ANSI 125/250.
- f. Media Temperature Range is -22–250 degrees F.
- g. Maximum Differential Pressure is 200 psi for 2- to 6- inch size.

E. Butterfly Valve Industrial Actuators

1. Actuators shall be approved under Canadian Standards Association or other Nationally Recognized Testing Laboratory to UL standards. CSA Class 4813 02 or equal. Enclosure shall be NEMA 4 (weatherproof) enclosure and will have an industrial quality coating.
 - a. Actuator shall have a motor rated for continuous duty. The motor shall be fractional horsepower; permanent split capacitor type designed to operate on a 120 VAC, 1pH, 60 Hz supply. Two (2) adjustable cam-actuated end travel limit switches shall be provided to control direction of travel. A self-resetting thermal switch shall be imbedded in the motor for overload protection.
 - b. Reduction gearing shall be designed to withstand the actual motor stall torque. Gears shall be hardened alloy steel, permanently lubricated. A self-locking gear assembly or a brake shall be supplied.
 - c. Actuator shall be equipped with a detachable hand crank or hand wheel for manual override to permit operation of the valve in the event of electrical power failure or system malfunction.
 - d. The actuator shall be analog, floating, or two position as called out in the control sequence of operation. All Analog valves shall be positive positioning, and respond to a 2–10 VDC, 4-20 mA, or adjustable signal as required. Analog actuators shall have a digital control card allowing any voltage input for control and any DC voltage feedback signal for position indication.

2.8 ENCLOSURES

- A. All controllers, power supplies and relays shall be mounted in enclosures.
- B. Interior enclosures shall be NEMA1, exterior enclosures shall be NEMA3R.
- C. Enclosures shall have hinged, locking doors.
- D. Provide laminated plastic nameplates for all enclosures in any mechanical room or electrical room. Include location and unit served on nameplate. Laminated plastic shall be 1/8" thick sized appropriately to make label easy to read.
- E. All temperature control panels shall be fabricated in a UL-listed panel shop. Field assembled temperature control panels are not allowed.

2.9 POWER SUPPLIES AND CONTROL TRANSFORMERS

- A. Basis of design PSH500 from functional devices.
- B. Provide 120V plug receptacle in all panels with terminal unit routers.
- C. Control transformers and power supplies shall be UL-Listed.
- D. Provide Class 2 current-limiting type or over-current protection in both primary and secondary circuits for Class 2 service per NEC requirements.
 1. Transformer shall be properly sized for application. Limit connected loads to 80% of rated capacity.
 2. Line voltage units shall be UL Recognized and CSA Approved.

- E. DC Power Supplies: DC power supply output shall match output current and voltage requirements. Power supply shall be full-wave rectified type with the following minimum Specifications:
 - 1. Built-in overvoltage and overcurrent protection and able to withstand a 150% current overload for a minimum of three (3) seconds without tripping or failure.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this section may properly commence.
- B. Notify the owner's representative in writing of conditions detrimental to the proper and timely completion of the work.
- C. Do not begin work until all unsatisfactory conditions are resolved.

3.2 GENERAL

- A. Install all line voltage wiring, concealed or exposed, in accordance with Division 26.
- B. All concealed control and low voltage wiring (above ceilings and in walls) may be installed in plenum rated cable.
- C. Supply/Install all necessary transformers/power supplies as required to power BAS instrumentation.
- D. DDC Contractor shall coordinate with other trades as required by Section 23 09 23. This shall include submitting documentation and coordination plans as described in that Section.
- E. DDC Contractor shall protect all products and retain them in manufacturer packaging until installed, as required by Section 23 09 23.
- F. DDC Contractor shall perform all Work under this Section in accordance with the manufacturer's instructions and the general workmanship requirements specified in Section 23 09 23 and in Division 23. DDC Contractor shall in addition observe the following requirements:
 - 1. All sensors and products shall be mounted rigidly and adequately supported.
 - 2. Wires attached to sensors shall be sealed against bulk air movement in their raceways or in the wall to prevent sensor readings from being affected by air transmitted from other areas.
 - 3. Sensors which provide data used to maintain a setpoint with variable-speed equipment (e.g. duct pressure sensor used for fan speed control, or end-of-loop differential pressure used for pump speed control) shall be hardwired directly to the same controller that controls the variable-speed equipment, which shall also be the controller where the variable speed control loop resides.
- G. Locate and install components for easy accessibility; in general, mount 48 inches above floor with minimum three (3) feet of clear access space in front of units. Obtain approval on locations from owner's representative prior to installation.
- H. All instruments, switches, transmitters, etc., shall be suitably wired and mounted to protect them from vibration, moisture, and high or low temperatures.
- I. Ethernet and Fiber network requirements are to be governed by Division 26 and Division 27 requirements.
- J. Underground conduit and wiring are only required where meters or alarm devices are necessarily located underground. Such wiring to be governed by associate spec sections and

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provided by respective trades.

- K. The selection and installation of line-voltage power wiring and wiring connections, including subpanels, conduit and raceways, required for Work in this Section shall be provided by the Division 26 contractor based on control panel locations pre-coordinated with the DDC Contractor.
- L. The selection and installation of low-voltage power wiring and wiring connections, including subpanels, conduit and raceways, required for Work in this Section shall be provided by the DDC Contractor.
- M. Where wiring specifications differ between Division 23 09 23 and other divisions, Division 23 09 23 shall take precedence when pertaining to Control, Communication, 24V wiring and associated conduit. This includes all IO, comm, and serial networks.
- N. The requirements of this section shall not supersede local or national codes.

3.3 POWER WIRING INSTALLATION

- A. Division 26 electrical contractor shall provide 120 volt, 20 amp circuits and circuit breakers from normal and/or emergency power panel for direct digital control systems.
- B. Division 23 09 23 contractor to provide documentation with panel locations and load requirements to Division 26.
- C. All 120V to BMS panels provided by division 26. General requirements for obtaining power include the following:
 - 1. Electrical service to controls panels and control devices shall be provided by isolated circuits, with no other loads attached to the circuit, clearly marked at its source. The location of the breaker shall be clearly identified in each panel served by it.
 - 2. Obtain power from a source that feeds the equipment being controlled such that both the control component and the equipment are powered from the same panel. Where equipment is powered from a 460V source, obtain power from the electrically most proximate 120V source fed from a common origin.
 - 3. Where control devices are located in or on new equipment, coordinate with the equipment manufacturer and feed the control with the same source as the equipment. If the equipment's control transformer is large enough and of the correct voltage to supply the controls, it may be used. If the equipment's control transformer is not large enough or not of the correct voltage to supply the controls, provide separate transformer(s).
 - 4. Unless transformers are provided with equipment, DDC Contractor shall provide transformers for all low voltage control devices including terminal units. Transformer(s) shall be located in control panels in readily accessible locations.
- D. Work shall comply with NEC with all state and local amendments, and all requirements of Division 26 Specification for power wiring.

3.4 CONTROL AND COMMUNICATION WIRING INSTALLATION

- A. General
 - 1. Terminate all control and/or interlock wiring.
 - 2. Install wiring in raceway or conduit when located in unconcealed or inaccessible locations, locations subject to foot traffic in the normal course of building operations, locations where wires may be damaged including equipment rooms within 8 feet of floor, or as required by code or AHJ.
 - 3. EMT conduit shall be used in the following applications:
 - e. Central plant
 - f. Cooling towers

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- g. Utility yards
 - h. Outdoor locations
 - i. Where exposed to damage.
- 4. In chiller and boiler utility yards, EMT conduit is the only acceptable routing type for DDC wiring.
- 5. Seismic ratings of equipment cannot be compromised. DDC contractor to use discretion where conflicts could arise, seismic takes precedence.
- 6. Do not install communication or signal wiring in raceway or enclosures containing high- or low-voltage power wiring.
- 7. Junction boxes may be used for terminal blocks to join sections of wire where long pulls or pulls with many bends are necessary.
- 8. Up to 4 bends and 150ft are allowable between wire pull sections.
- 9. Run direct current signal wires separately from alternating current conductors. Where allowed by code, AC and DC wiring routes shall only cross at a 90-degree angle.
- 10. All temperature sensors on external walls shall have sealed handy boxes and foam backing plates to insulate the temperature sensor from drafts in the wall.
- B. All wiring shall be installed in a neat and workmanlike manner.
- C. Follow all manufacturers' installation recommendations.
- D. Shielding
 - 1. Maintain continuous shielding of all communications and signal wiring.
 - 2. Shields shall be grounded only at controller or power source end and floated at other end, unless otherwise recommended by the controller manufacturer.
 - 3. Float shields through termination points, maintaining only on single grounding point and insulating from ground at all other points.
- E. Identification
 - 1. Use color-coded conductors consistently throughout the entire DDC System installation.
 - 2. All field wiring shall be properly labeled at each end.
- F. The DDC Contractor shall verify integrity of all wiring to ensure continuity and freedom from shorts and grounds after the installation is complete.
- G. All field wiring shall be properly labeled at each end for the following:
 - 1. All central plant IO and comm

3.5 TAGS AND LABELING

- A. Valves.
 - 1. Provide brass tags 1 ½" Diameter on each valve.
 - 2. Text size is to be 3/16" minimum.
 - 3. Tags to include valve number.
- B. Panel Face.
 - 1. Provide phenolic tags with white letters, black background.
 - 2. Attach to panels with adhesive.
 - 3. Text size is to be 1/4" minimum.
 - 4. Tags to include panel name and number.

3.6 WATER SENSORS AND DEVICES

A. Temperature Sensors (Installation by Division 23 Mechanical)

1. All temperature sensors in pipes shall be installed in thermowell with thermally-conductive grease. Direct immersion installation is not acceptable.
2. Thermowell shall penetrate pipe by lesser of 8 inches or half pipe diameter. For small pipes, well shall be installed in an elbow into pipe length.
3. Insulate top of thermowell with a patch of closed-cell insulation, to provide a complete thermal break but allow easy access to sensor.
4. Install test port adjacent to each thermowell.
5. Provide sufficient wiring (or flexible conduit, per installation location) to allow sensor to be removed from thermowell for calibration or replacement.

B. Flow Meters (Installation by Division 23 Mechanical)

1. Install per manufacturer's recommendations for unobstructed straight length of pipe both upstream and downstream of sensor.
2. If sufficient straight pipe is not available, notify Engineer of Record.
3. Install with isolation valves immediately upstream and downstream of meter. If hot tapping an operating hydronic system, provide hot-tap isolation valve instead to enable sensor removal without water supply system shutdown.
4. For Insertion-Type meters
 - a. Install meter in correct orientation relative to pipe so that turbine is aligned with fluid flow.
 - b. Install using manufacturer-provided depth gauge to ensure that sensor is correctly positioned at center of pipe. Always place depth gauge against exterior of pipe, not against pipe insulation.
5. Test meter per the manufacturer's startup and commissioning recommendations.
6. Complete all manufacturer's startup documentation and include with Pre-Functional Test report

C. BTU Meters

1. Connect to signal converter unit for I/O. All I/O points shown as hardwired on Building Automation Drawings shall be installed as hardwired points when used for control.
2. BACnet integration for totalization is acceptable.

3.7 SWITCHES AND STATUS INDICATORS

A. Current Switch

1. Adjust current setpoint (i.e. ON/OFF signal threshold) as follows:
 - a. For fan status, with discharge damper: Adjust so that fan status is OFF when fan discharge damper is fully closed while fan is running.
 - b. For fan status, with belt-driven fan: Adjust so that fan status is OFF when fan belt is broken and motor is running.
 - c. For pump status: Adjust so that pump status is OFF when pump is running with shutoff valves closed (i.e. pump is dead-headed).

3.8 DDC CONTROLLER INSTALLATION

A. Physical Installation

1. Central System Controllers and associated devices shall be assembled into panels or enclosures by DDC Contractor in a workshop environment.
2. Install controllers in appropriately rated enclosures as required by field conditions and this Section.

3. Install all controllers in readily accessible location.
4. For every Central System Controller, provide a dedicated power switch if the controller does not include one built in.
5. Connect controllers to a power source of equal reliability (normal, emergency, uninterruptable, etc.) to the power source of the equipment being controlled.
6. HVAC systems and equipment served by a backup power source or UPS shall have associated DDC system products that control such systems and equipment also served from a backup power source or UPS.
7. Connect sensors, actuators and other attachments such that they can be quickly and easily disconnected for service. All wiring connections shall be made to field-removable, modular terminal strips.

B. Functional Installation

1. Configure DDC System to share data between networked controllers and other network devices.
 - a. Point information from any controller (including BCs, AACs, and ASCs) and from any gateway shall be capable of being used in a control sequence in any other panel.
 - b. The use of a computer or another DDC device as a communications server between control panels and/or gateways is not acceptable.
2. Each individual mechanical system or piece of equipment shall be controlled by no more than one controller with sufficient capacity to be connected to all field devices and sensors associated with that system and/or piece of equipment.
 - a. All points associated with and common to one unit or other complete system or equipment shall reside within a single controller (including I/O expander boards as allowed below). Point data which may be transmitted over the LAN are limited to the following exceptions:
 - i. Global points such as outdoor air temperature, building pressure.
 - ii. Requests sent from zones to systems or systems to plant, used to trigger equipment operation or reset setpoints.
 - iii. Mode information sent from zones to systems or systems to plant used to select or change operating logic.
 - iv. Notwithstanding these exceptions, all operations required to maintain a controlled variable at setpoint must still be performed entirely within a single controller.
3. Configure controllers for automatic safe restart after a loss of power:
 - a. If programming is intact, the controller shall resume full operation without operator intervention. All monitored functions shall be updated.
 - b. If battery backup has been exhausted or programming is lost for any reason, the controller shall automatically report this condition and prepare to receive a download over the network.
 - c. The controller shall automatically reset its clock such that time dependent functions occur on schedule without a manual reset.
 - d. The DDC Contractor shall pre-configure staggered start such that the startup surge or inrush current of each major piece of equipment (air handling unit, boiler plant, chiller plant, etc.) has time to resolve before the next start event.

3.9 TESTING AND COMMISSIONING

A. General

1. Perform tasks in the order outlined subject to direction of the General Contractor.
2. Notify the Owner Representative and the Engineer if jobsite circumstances, Project

schedule, or General Contractor instructions require substantial deviation from this sequence of events.

3. DDC Contractor shall provide a qualified technician who shall execute all Functional Tests in the presence of the Owner Representative and the Engineer of Record.
4. All deficiencies identified shall be corrected and demonstrated to the Owner Representative after resolution for acceptance.

B. Test Forms

1. Point-to-Point Test Forms
2. Provide forms for all checks and tests
3. Point-to-Point (Pre-Functional) and Functional Test procedures and associated forms shall be prepared by owner representative or commissioning agent.
4. If there is no owner representative then DDC Contractor shall prepare forms to verify correct execution of Sequences of Operations logic and correct operation of all alarms, interlocks, and schedules without compromising system integrity or damaging any piece of equipment.
5. Each form shall have a header or footer where the technician performing the test can indicate his/her name and the date of the test.
6. All forms shall be provided in digital format.
7. Test and Balance forms shall be provided by Test and Balance (TAB) Contractor.

C. Point-to-Point Tests

1. Inspect the installation of all devices. Review the manufacturer's installation instructions and validate that the device is installed in accordance with them.
2. Ensure devices are properly installed with adequate clearance for maintenance.
3. Ensure that wiring and tubing are run in a neat and workman-like manner, either bound or enclosed in raceway.
4. Verify that all sensor locations are as indicated on drawings and are away from heat sources and other causes of erratic operation.
5. For each controller, perform Point Verifications and Point-to-Point Tests
 - a. Binary Outputs:
 - i. Verify proper installation
 - ii. Verify correct normal position
 - iii. Verify correct response to command including parity of response (i.e. verify that a command OFF turns equipment off and not on).
 - b. Binary Inputs:
 - i. Verify proper installation
 - ii. Verify signal from device maps to correct signal at graphical interface.
 - iii. Verify input signal thresholds are correct
 - c. Analog Outputs
 - i. Verify proper installation
 - ii. Verify correct normal position.
 - a. Test all fail-safe actuators by disconnecting power and verifying direction of travel.
 - iii. Verify correct response to command including direction of movement.
 - iv. Verify correct start and span (maximum and minimum stroke)
 - a. Verify that all automatic valves and dampers close completely upon a closed command. Adjust valve stem and damper blade travel as required.

- b. Verify/adjust output range for points sending commands (e.g. setpoint) to other equipment.
 - d. Analog Inputs
 - i. Verify installation of sensors.
 - ii. Verify correct signal and mapping at graphical interface.
 - iii. Calibrate sensors that require field calibration, if any, as note on points list on Building Automation drawings or specifically listed elsewhere in this specification section.
 - a. Adjust calibrating parameters in software (such as slope and intercept) as required.
 - b. A calibration log shall be kept and initialed by the technician indicating date and time, sensor and hand-held readings, and calibration constant adjustments and included in the Pre-functional Test Report.
 - c. Inaccurate sensors must be replaced if calibration is not possible.
- 6. User Interface Checks
 - a. All user interface elements and graphics are functional.
 - b. Graphics are properly bound to physical devices or virtual points.
 - c. Links and page jumps are functional and logical.
 - d. Events and alarms are annunciated timely
- 7. Point-to-Point Test Report
 - a. Document results on forms and submit for approval as Point-to-Point Test report.
 - b. Point-to-point tests must be performed and documented for every individual point in the system. Testing a sample or subset of points shall not be acceptable. The Point-to-Point report shall not be accepted, nor shall further work be authorized, until all point-to-point tests have been completed to the satisfaction of the Engineer of Record and Owners Representative.

D. Test and Balance

- 1. Coordinate with Work performed under Division 23 Test and Balance (TAB). DDC Contractor shall support TAB Contractor in execution of tests that require interaction with or overrides of the DDC System.
- 2. Provide informal training of (1) hour to TAB contractor foreman and subordinate with the purpose of allowing them to navigate and adjust all hardware and software necessary to perform their scope autonomously.
- 3. Software shall be provided to TAB Contractor free of charge on a temporary basis to allow calibration of non-zone equipment controls and other Work specified under Division 23 TAB.

E. Functional Tests

- 1. Functional Tests shall test all control logic in a formal manner to verify that Sequences of Operation were programmed accurately and provide the intended system behavior. Owner representative and Engineer of Record will witness these tests.
- 2. Each functional test shall consist of a series of defined steps.
 - a. For each step, test form shall include descriptions of an action/override to initiate the step and the expected system response.
 - b. For each step, technician performing test shall record actual system response and any notes or comments.
 - c. Expected response and actual response shall be described qualitatively (e.g. "fan speed increases") or quantitatively (e.g. "setpoint increases by 1.5°F") as

- appropriate.
 - d. Technician shall describe all observed responses. Where quantitative results are expected, technician shall record specific values observed.
 - 3. Testing schedule shall be coordinated with Owner's Representative, commissioning agent and Engineer of Record.
 - 4. All accepted Functional Tests shall be conducted by the DDC Contractor with results confirmed and signed by the Contractor's technician.
 - 5. Functional Test Report
 - a. After submitted test forms and trends have been accepted, DDC Contractor shall perform all listed tests, take corrective action as required for failed tests, and repeat tests until a passing condition is obtained.
 - b. Document results on forms and submit digitally for approval as Functional Test report.
- F. Remedial Work
 - 1. Failed demonstration tests will require any remedial work at no additional cost to owner.
 - 2. It is possible that deficiencies in the trades of others can be uncovered through course of Division 23 functional testing. Such deficiencies to be corrected at the expense of the associated trade and compensation for troubleshooting, diagnosing and retesting on the part of the DDC contractor to be back charged to the offending trade.

3.10 TRAINING

- A. Include 16 hours total of on-site training to assist personnel in becoming familiar with site-specific issues, systems, sequences of operations, etc.
- B. Training Schedule
 - 1. Schedule training to provide Owner with at least 10 business days advance notice.
 - 2. Training shall occur within normal business hours at a mutually agreed on time. Unless otherwise agreed to, training shall occur Monday through Friday, except on U.S. Federal holidays.
 - 3. Training shall be on site.
- C. Attendance Tracking
 - 1. Circulate sign-in sheet at beginning of each session and solicit attendees to sign/initial.
- D. Off-Site Primary/Factory System Training
 - 1. Factory training is not required.
- E. Regular Operators shall be trained to perform the following tasks:
 - 1. Understand control system architecture and configuration
 - 2. BMS Control system components
 - 3. Understand system operation and Sequences of Operations
 - 4. Operate the workstation and peripherals
 - 5. Log on and off the system
 - 6. Access graphics, point reports, and logs
 - 7. Adjust and change system set points, time schedules, and holiday schedules
 - 8. Understand and acknowledge alarms
 - 9. Understand system drawings, and Operation and Maintenance manual
 - 10. Understand the Project layout and location of control components
 - 11. Print reports
 - 12. Export trends

F. Training Materials

1. Present 1 hard copy of the approved submittals and as-builts as described above.
2. Provide each attendee with a color hard copy of all training materials and visual presentations.
3. Hard-copy materials shall be organized in a three-ring binder with table of contents and individual divider tabs marked for each logical grouping of subject matter. Organize material to provide space for attendees to take handwritten notes within training manuals.
4. In addition to hard-copy materials included in the training manual, provide each binder with a sleeve or pocket that includes a DVD or flash drive with PDF copy of all hard-copy materials.

END OF SECTION

SECTION 23 21 13

HYDRONIC PIPING

PART 1 - GENERAL

1.01 CONDITIONS AND REQUIREMENTS

- A. General: All provisions of the General Conditions, Supplementary Conditions, Notice to Bidders, other front-end documents, Division 1 Specifications, other Divisions of the Specifications, and all drawings apply to the work of this Section as fully as if repeated here.
- B. The work of this Division includes but is not necessarily limited to furnishing and installing chilled and heating hot water systems as indicated in the drawings, as specified herein and as required to complete the work.

1.02 SUMMARY

- A. Work Included: Provide complete hydronic piping systems in accordance with the requirements of this Section. Hydronic piping work includes but is not necessarily limited to:
 - 1. Heating hot-water piping systems.
 - 2. Chilled water piping systems.
 - 3. Condensate drain piping systems.
 - 4. Air-vent piping systems.
 - 5. Equipment and piping drain systems.
 - 6. Providing all equipment, pipes, valves, hangers, supports and accessories.
 - 7. Providing pipe and equipment support structures.
- B. Work Described Elsewhere: Common Work Results for HVAC, General-Duty Valves for HVAC Piping, Meters and Gauges for HVAC Piping, Identification for HVAC Piping and Equipment, Hydronic Pumps, Variable Frequency Drives, Testing, Adjusting and Balancing, Startup and Commissioning work are described in other Sections of Division 23.
 - 1. Electrical, Division 26.
 - 2. Meters and Gauges for HVAC Piping, Section 23 05 19.
 - 3. Variable Frequency Drives, Section 23 05 14.
 - 4. Hydronic Pumps, Section 23 21 20.

1.03 QUALITY ASSURANCE

- A. Codes, Regulations and Standards:
 - 1. ASME, Boiler and Pressure Vessel Code, Sections IV and VIII.
 - 2. ASME B31.9, Building Services Piping.
 - 3. ANSI/ASME SEC 9 - Welding and Brazing Qualifications.
 - 4. ANSI/AWS D10.12 – Guide for Welding Mild Steel Pipe.
 - 5. ASTM A234 – Pipe Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
 - 6. ASME B36.1 – Standardization of dimensions of welded and seamless wrought steel pipe for high or low temperatures and pressures.

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7. ASTM B42, Specification for Seamless Copper Pipe.
- B. Steel Support Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- C. Pipe Welding: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code: Section IX.
 1. Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation.
 2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

1.04 SUBMITTALS

- A. Product Data: Provide submittals for all equipment and materials including pipes, supports, valves, and accessories.
- B. Valves: Submit product data for each type of special-duty valve. Include flow and pressure drop curves based on manufacturers' testing for diverting fittings, calibrated balancing valves, and automatic flow-control valves.
- C. Shop Drawings: Detail piping layout, elevations, pipe size, hangers and supports, fabrication of pipe anchors, hangers, special pipe support assemblies, alignment guides, expansion joints and loops, and their attachment to the pipe support structures. Detail location of anchors, alignment guides, and expansion joints and loops.
- D. Welding Certificates: Copies of certificates for welding procedures and personnel.
- E. Field Test Reports: Written reports of tests specified in Part 3 of this Section. Include the following:
 1. Test procedures used.
 2. Test results that comply with requirements.
 3. Failed test results and corrective action taken to achieve requirements.
- F. Maintenance Data: For hydronic specialties and special-duty valves to include in maintenance manuals specified in Division 1.

PART 2 – PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Hydronic piping components and installation shall be capable of withstanding the following minimum working pressure and temperature unless otherwise indicated:
 1. Heating Hot Water Piping: 150 psig at 200 deg F.
 2. Chilled Water Piping: 150 psig at 200 deg F.
 3. Condensate Drain Piping: 150 deg F.
 4. Air Vent Piping: 200 deg F.

5. Safety Valve Inlet and Outlet Piping: Equal to the pressure of the piping system to which it is attached.

2.02 CHILLED WATER PIPING (CHWS, CHWR)

- A. Piping (Exterior Locations, 2-1/2" through 6"): Schedule 40 black steel per ASTM A-53, Grade B, ERW.
 1. Wrought-steel, butt-welding fittings per ASME B16.9, wall thickness to match adjoining pipe.
 2. ANSI 125 LB rated cast-iron raised-face flanges with compressed-ring flange gaskets for connections to equipment and valves.
- B. Piping (Exterior locations, 2-1/2" and smaller): Type L drawn-temper copper tubing, wrought-copper fittings, and soldered joints.
- C. Shut-Off Valves (2-1/2" and Larger): Nibco WD 2000, Grinnell, Centerline; Wafer-type butterfly valve; ductile iron body per ASTM A-536; 200 LB WOG service rating; aluminum-bronze disc; type 416 stainless steel stem; EPDM seat.
 1. 10-position lever-lock operator for valves 6" and smaller.
 2. Gear and hand wheel operator for valves 8" and larger.
 3. Gear and chain wheel operator for valves located more than 84" above the adjacent floor.
- D. Shut-Off Valves (2" and smaller): Two-piece ball valves.
- E. Dielectric Nipples: Grinnell or approved equal.
 1. Standard: IAPMO PS 66.
 2. Electroplated steel nipple, complying with ASTM F 1545.
 3. Pressure Rating: 300 psig at 225 deg F.
 4. End Connections: Male threaded or grooved.
 5. Lining: Inert and noncorrosive, propylene.

2.03 HEATING HOT WATER PIPING (HWS, HWR)

- A. Piping (Exterior Locations, 2-1/2" through 6"): Schedule 40 black steel per ASTM A-53, Grade B, ERW.
 1. Wrought-steel, butt-welding fittings per ASME B16.9, wall thickness to match adjoining pipe.
 2. ANSI 125 LB rated cast-iron raised-face flanges with compressed-ring flange gaskets for connections to equipment and valves.
- F. Piping (Exterior locations, 2-1/2" and smaller): Type L drawn-temper copper tubing, wrought-copper fittings, and soldered joints.
- G. Shut-Off Valves (2-1/2" and Larger): Nibco WD 2000, Grinnell, Centerline; Wafer-type butterfly valve; ductile iron body per ASTM A-536; 200 LB WOG service rating; aluminum-bronze disc; type 416 stainless steel stem; EPDM seat.

1. 10-position lever-lock operator for valves 6" and smaller.
2. Gear and hand wheel operator for valves 8" and larger.
3. Gear and chain wheel operator for valves located more than 84" above the adjacent floor.

H. Shut-Off Valves (2" and smaller): Two-piece ball valves.

I. Dielectric Nipple: Grinnell or approved equal.

1. Standard: IAPMO PS 66.
2. Electroplated steel nipple, complying with ASTM F 1545.
3. Pressure Rating: 300 psig at 225 deg F.
4. End Connections: Male threaded or grooved.
5. Lining: Inert and noncorrosive, propylene.

2.04 CONDENSATE DRAIN PIPING (CD)

A. Piping: Type M, drawn-tempered copper tubing, wrought-copper fittings, and soldered joints.

2.05 AIR VENT PIPING

J. Air-Vent Piping:

1. Inlet: Same as service where installed.
2. Outlet: Type K, annealed-temper copper tubing with soldered joints.

2.06 ACCESSORIES

A. Triple Duty Valves: Bell and Gossett Model 3DS, Amtrol, Taco; Straight pattern valve combining the functions of a non-slam check valve, throttling valve, shut-off valve and balancing valve. Rated for 175 PSIG at 250°F.

1. Cast iron construction.
2. 125 LB ANSI flanged piping connections.
3. EPDM seats.
4. Replaceable bronze disc.
5. Stainless steel stem.
6. Brass readout valves.

B. Pump Suction Diffusers (where used): Bell and Gossett Model FLG, Amtrol, Taco; Angle-body, combination flow straightener and strainer. Rated for 175 PSIG at 250°F.

1. Cast iron body.
2. 125 LB ANSI flanged piping connections.
3. Replaceable steel straightening vanes.
4. Non-collapsing strainer cylinder with 3/16" diameter openings.
5. 16-mesh, removeable start-up screens.
6. Adjustable support foot.
7. Gauge ports.
8. Blow-down connection.

- C. Pump Connectors (2-1/2" and larger): Metraflex SL, Keflex, Flexonics; Braided-type, flexible pump connector. Rated for 270 PSIG at 70°F.
 - 1. Type 321 stainless steel corrugated inner tubing.
 - 2. Type 321 stainless steel wire braid outer shield.
 - 3. ANSI flanged end connections.
 - 4. Capable of 1/2" lateral deflection.
- D. Strainers (Steel Pipe, 2-1/2" and Larger): Metraflex B-1-M, Armstrong, Fabrotech; Basket-type, in-line, pipe strainer rated for 200 PSIG and 100°F.
 - 1. Cast iron body.
 - 2. Stainless steel screen with 0.062" diameter holes.
 - 3. Flanged end connections.
- E. Check Valves: Metraflex 900 Series: Globe-style, in-line, silent check valve. Rated for 200 PSIG and 150°F.
 - 1. Cast iron body per ASTM A48, Class 35.
 - 2. Bronze disc per ASTM B584.
 - 3. Type 304 Stainless steel spring.
 - 4. ANSI 125 LB flanged end connections.
- F. Manual Air Vents: Bronze body and nonferrous internal parts, 150-psig working pressure, 225 deg F operating temperature, manually operated with screwdriver or thumb screw with NPS 1/8 discharge connection and NPS 1/2 inlet connection.
- G. Automatic Air Vents: Designed to vent automatically with float principle, bronze body and nonferrous internal parts, 150-psig working pressure, 240 deg F operating temperature with NPS 1/4 discharge connection and NPS 1/2 inlet connection.
- H. Bladder-Type Expansion Tanks: Welded carbon steel, rated for 125-psig working pressure and 375 deg F maximum operating temperature. Factory test with taps fabricated and supports installed and labeled according to ASME Boiler and Pressure Vessel code: Section VIII, Division 1. Bladder shall be securely sealed into the tank to separate air charge from system water to maintain required expansion capacity. Air-Charge fitting: Schrader valve, stainless steel with EPDM seats.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Piping Installation: Install piping level and parallel to the structure line; free from contact with the structure; without bending, sagging, springing, or forcing; and without interfering with or obstructing other utilities or building features.
- B. Pipe Sizing: Run full pipe size through shut-off valves, balancing valves, etc. Change pipe sizes within three pipe diameters of final connections to control valves and equipment connections. Un-sized pipe sections shall be the same size as the largest pipe connected to it.

- C. Pipe Supports: Support all above grade piping from pipe support structures. Provide auxiliary members, anchors, guides, and sway braces necessary to maintain pipe alignment and prevent excessive movement or strain on the piping system or its components. Size hanger rods, bolts, clamps, and ancillary components according to manufacturer's recommendations.
 - 1. Horizontal pipe support spacing shall be no greater than 6 feet on center for pipes 1-1/2" and smaller and 8 feet on center for pipes 2" and larger.
- D. Pipe Expansion: Allow for thermal expansion and contraction of hot and chilled water piping.
- E. Vents and Drains: Provide automatic air vents at all high points in water piping systems; provide drains at all low points.
- F. Equipment Installation: Install all equipment level and secure providing all necessary shims, anchors, supports and other auxiliaries; provide clearances as required for maintenance; provide vibration isolation materials for rotating equipment.
- G. Equipment Support: Provide support for all equipment including hold-down clips, anchor bolts, and support structures.
- H. Changes in Pipe Size: Make changes in size with eccentric reducing fittings only; install reducers with level side at the top of the pipe.
- I. Changes in Pipe Direction: Make changes in direction with manufactured fittings only; short radius elbows not allowed.
- J. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- K. Install piping to permit valve servicing.
- L. Install piping at indicated slopes.
- M. Install piping free of sags and bends.
- N. Install fittings for changes in direction and branch connections.
- O. Select system components with pressure rating equal to or greater than system operating pressure.
- P. Install groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.
- Q. Install drains, consisting of a tee fitting, NPS 3/4 ball valve, and short NPS 3/4 threaded nipple with cap, at low points in piping system mains and elsewhere as required for system drainage. Provide hose adapter.
- R. Install piping at a uniform grade of 0.2 percent upward in direction of flow.
- S. Reduce pipe sizes using eccentric reducer fitting installed with level side up.

- T. Install branch connections to the mains using tee fittings in main pipe, with the branch connected to the bottom of the main pipe.
- U. Install unions in piping, NPS 2 and smaller, adjacent to valves, at final connections of equipment, and elsewhere as indicated.
- V. Install flanges in piping, NPS 2-1/2 and larger, at final connections of equipment and elsewhere as indicated.
- W. Install shutoff valve immediately upstream of each dielectric fitting.
- X. Install safety valves on hot-water generators and elsewhere as required by the ASME Boiler and Pressure Vessel Code.
- Y. Install pressure-reducing valves on make-up water supply and elsewhere as required to regulate system fill pressure.
- Z. Install expansion tanks where indicated. Vent and purge air from hydronic system and ensure tank is properly charged with air to suit system design requirements.

3.02 PIPE JOINT CONSTRUCTION

- A. Ream the ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- D. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- E. Welded Joints: Construct joints according to AWS D10.12M/D10.12, using qualified processes and welding operators.
- F. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gaskets concentrically positioned. Use suitable lubricants on bolt threads.

3.03 DIELECTRIC FITTING INSTALLATION

- G. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
- H. Dielectric Fittings for NPS 3 and Smaller: Use dielectric nipples.

3.04 QUALITY CONTROL

- A. Pipe Flushing: Prior to start-up, thoroughly flush all piping systems to remove foreign materials.
- B. Water Pipe Pressure Test: Pre-test piping system for major leaks with compressed air at 5 PSIG for 30 minutes. Repair any major leaks and retest until the test criteria are satisfied. After successful completion of the pre-test, fill the system with water, vent air and perform a pressure test at 150 PSIG for 4 hours. Repair any leaks and retest until the test criteria are satisfied.
 - 1. Before testing, disconnect or remove any device that is not rated for the test pressure such as chillers, boilers, pumps, and flexible connectors.
- C. Pipe Cleaning: Fill and vent system, add cleaning chemicals to obtain a concentration of at least 1,200 PPM (approximately 5 gallons per 1,000 gallon volume) and circulate at normal operating temperatures for at least 6 hours. At completion:
 - 1. Drain system and dispose of the cleaning agent in accordance with code requirements.
 - 2. Continue to flush and drain system until cleaning chemical is neutralized.
 - 3. Refill system with industrial cold water and vent all air.
 - 4. Introduce treatment chemicals in sufficient quantity to obtain a concentration of 400 PPM (approximately 16 LBS per 1,000 gallons).
 - 5. Add corrosion inhibitors in accordance with the manufacturer's instructions.

3.05 ADJUSTING AND FINISHING

- A. General: Start-up, adjust and balance hydronic water systems and place in satisfactory operation.
- B. System Start-Up: After installation, cleaning, pressure testing and filling is complete, but before chillers and boilers are initially started, the equipment manufacturer's field service representatives shall inspect and approve the installation for start-up and operation. After towers and chillers are subsequently started, the representative shall check unit operation, make necessary adjustments, and certify that the condenser water system is operating properly.
- C. Water Treatment: Introduce treatment chemicals into the condenser water system as recommended by the treatment system manufacturer.
- D. Test Reports and Certifications: Provide all test reports and certifications.

END OF SECTION

SECTION 23 21 23

CENTRIFUGAL PUMPS

PART 1 - GENERAL

1.1 CONDITIONS AND REQUIREMENTS

- A. General: All provisions of the General Conditions, Supplementary Conditions, Notice to Bidders, other front-end documents, Division 1 Specifications, other Divisions of the Specifications, and all drawings apply to the work of this Section as fully as if repeated here.
- B. The work of this Division includes but is not necessarily limited to furnishing and installing chilled water and heating hot water pumps as indicated in the drawings, as specified herein, and as required to complete the work.

1.2 RELATED WORK

- A. Section 23 05 13, Common Motor Requirements for HVAC Equipment
- B. Section 23 05 14, Variable Frequency Drives
- C. Section 23 05 48, Vibration and Seismic Control for HVAC Piping and Equipment

1.3 SUBMITTALS

- A. Provide submittals for all equipment and materials including HVAC pumps. Submittals include, but are not limited to:
 - 1. Equipment identification as referenced in the documents.
 - 2. Manufacturer's name and model number.
 - 3. Shop drawings showing dimensions, weights, point loadings, locations for mounting bolt holes, locations and sizes of field connections, and required clearances.
 - 4. Materials of construction including seals.
 - 5. Capacities and ratings.
 - 6. Pump curves with operating points clearly indicated. For parallel pump applications, indicate the operating point of the combined case and the operating point of only one pump.
 - 7. Motor data.
 - 8. Electrical requirements, wiring diagrams.
 - 9. Manufacturer's installation instructions.
 - 10. Startup instructions, maintenance data, parts lists, and accessories.
 - 11. Manufacturer's warranty. Ensure forms have been filled out in the Owner's name and registered with the manufacturer.

1.4 DESIGN CRITERIA

- A. Pump sizes, capacities, pressures, and operating characteristics shall be as scheduled.
- B. Pumps shall meet or exceed the operating efficiencies scheduled.

- C. Furnish pumps with motors, impellers, drive assemblies, bearings, and accessories as specified. Furnish pump couplings with OSHA-compliant coupling guards.
- D. Where pumps are indicated for parallel operation, scheduled conditions are for that pump with two pumps operating, i.e., the total system flow rate is twice that scheduled for a single pump. When only one of two pumps is operating, the operating point of that pump must fall within the manufacturer's recommended operating range.
- E. Select a motor with a sufficient horsepower rating for non-overloading operation over the entire pump curve.
- F. Furnish each pump and motor with a nameplate giving the manufacturer's name, the serial number of the pump, capacity in GPM and head in feet at design condition, horsepower, voltage, frequency, speed, and full load current.
- G. Test the pumps hydraulically at 150% of rated pressure per Hydraulic Institute Standards, and clean and paint them before shipment. The manufacturer shall certify all pump ratings.
- H. Pumps shall operate without objectionable noise or vibration.
- I. After balancing completion, if water balancing results in the pump discharge balancing valve being closed 50% or more, replace or trim the impeller so that the balancing valve is opened at least 75% to maintain the design flow rate. Where pumps are driven by VFDs, balancing should be performed with pumps at design speed.
- J. Furnish one spare seal for each pump to the Owner.
- K. Head for pumps submitted for pumping through chillers and boilers shall be increased, if necessary, to match the equipment approved for the project.

PART 2 - PRODUCTS

2.1 END SUCTION CENTRIFUGAL PUMPS (FLEXIBLE COUPLED)

- A. Manufacturers: Bell and Gossett Series 1510, Paco, Taco, or equal.
- B. Pumps shall be base mounted, end-suction, split case, flexible-coupled, single-stage, cast-iron casing, bronze-fitted centrifugal pumps, rated for a working pressure of 175 psi and continuous operating temperature of 225°F. The pump design shall allow servicing of the impeller and bearing assembly without disturbing the piping or motor or requiring shaft realignment.
- C. Class 30 cast iron casing per ASTM A159 with 125 LB ANSI flanged end connections. Casings shall have tapped and plugged openings for vent, drain, and suction and discharge gauge connections.
- D. One-piece, cast-bronze, single-suction impellers shall be hydraulically and dynamically balanced to ANSI/HI 1.1-1.5-1994, Section 1.4.6.1.3.1, Figure 1.106 Balance Grade G6.3, keyed and locked to pump shafts and protected by replaceable bronze shaft sleeves.
- E. Pump shafts shall be high-strength carbon steel, sealed, and gasketed from the pumped fluid.
- F. Pump shafts shall be 416 stainless steel.

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- G. Pumps shall be furnished with mechanical seals with carbon rotating faces, ceramic stationary seats, Buna-N elastomer, and 316 SS spring, rated up to 225°F continuous operation.
- H. Bearing assemblies shall be cast iron with re-greaseable ball bearings.
- I. Spacer-type couplings or couplings with extended hubs shall be used to allow for pump servicing.
- J. Pumps shall be furnished with welded, structural steel channel base frames.
- K. NEMA-rated, TEFC premium high-efficiency electric motors.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install pumps per the manufacturer's instructions to avoid stress and misalignment.
- B. Equipment Support: Support all equipment as required by the structural engineer. Refer to the structural drawings. Provide hold-down clips, anchor bolts, and support structures as required.
- C. Set base-mounted pumps on concrete bases, level, and bolt down before grouting. Fill the entire base with non-shrinking grout. Use end caps during grouting to prevent overflow when end caps are not integral with base plates.
- D. Align flexibly coupled pumps after base grouting is complete. Align pump and motor in all four planes: vertical angular, horizontal angular, vertical parallel, and horizontal parallel. Alignment shall be within the recommended value by the manufacturer but not over 1/64" for parallel alignment and 1/64" per inch of coupler radius for angular alignment. Record and submit all results of the alignment procedure to the Engineer. After alignment is complete, pin the pump and motor to the base.
- E. Where pump connection and pipeline sizes are not identical, provide concentric reducers/increasers for vertical piping at pump connections and eccentric reducers/increasers for horizontal piping at pump connections. Install eccentric reducers/increasers with top of pipe level. Valves and piping specialties shall be full line size as indicated on drawings.
- F. Provide clearances as required for maintenance.
- G. Provide vibration isolation materials for rotating equipment.

3.2 STARTUP

- A. Verify that the piping system has been flushed, cleaned, and filled.
- B. Prime the pump and vent air from the casing, and verify the correct rotation. Do not start or run the pump in dry condition.
- C. Verify the lubrication of motor and pump bearings and lubricate them properly, following the manufacturer's recommendation.
- D. After 48 hours of operation, remove the startup strainers and turn them over to the Owner.
- E. Perform field mechanical balancing, if necessary, to meet manufacturer's recommended vibration tolerance.

F. Test Reports and Certifications: Provide all test reports and certifications.

END OF SECTION

SECTION 23 25 13

WATER TREATMENT FOR CLOSED-LOOP HYDRONIC SYSTEMS

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 as fully as if repeated here.

1.2 SUMMARY

- A. Section includes the following water treatment for closed-loop hydronic systems:
 - 1. Manual chemical-feed equipment.
 - 2. Chemicals.

1.3 DEFINITIONS

- A. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.
- B. RO: Reverse osmosis.
- C. TSS: Total suspended solids are solid materials, including organic and inorganic, suspended in the water. These solids may include silt, plankton, and industrial waste.

1.4 SUBMITTALS

- A. Product Data: Include rated capacities, operating characteristics, and accessories for chemical bypass chemical feeders, including valves, pipes and accessories.
 - 1. Basis for Seismic Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. Dimensioned Outline Drawings: Identify the 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.
 - 4. Water treatment chemicals including MSDS sheets.

1.5 QUALITY ASSURANCE

- A. HVAC Water-Treatment Service Provider Qualifications: An experienced HVAC water-treatment service provider capable of analyzing water qualities, installing water-treatment equipment, and applying water treatment as specified in this Section.

1.6 MAINTENANCE SERVICE

- A. Scope of Maintenance Service: Provide chemicals and service program to maintain water conditions required above to inhibit corrosion and scale formation for chilled and heating hot water piping and equipment. Services and chemicals shall be provided for a period of one year from date of Substantial Completion and shall include the following:
 - 1. Initial water analysis and HVAC water-treatment recommendations.
 - 2. Startup assistance for Contractor to flush the systems, clean with detergents, and initially fill systems with required chemical treatment prior to operation.
 - 3. Periodic field service and consultation.
 - 4. Customer report charts and log sheets.
 - 5. Laboratory technical analysis.
 - 6. Analyses and reports of all chemical items concerning safety and compliance with government regulations.

PART 2 - PRODUCTS

2.1 WATER QUALITY PROGRAM

- A. Water Quality Program: Water One.
- B. Water quality for hydronic systems shall minimize corrosion, scale buildup, and biological growth for optimum efficiency of hydronic equipment without creating a hazard to operating personnel or the environment.
- C. Base the water treatment program on the quality of water available at project site, the hydronic system equipment and materials, and functional performance characteristics, operating personnel capabilities, and requirements and guidelines of authorities having jurisdiction.
- D. Closed hydronic systems, including heating hot water and chilled water, shall have the following water qualities:
 - 1. pH: Maintain a value within 9.0 to 10.5.
 - 2. "P" Alkalinity: Maintain a value between 100 to 500 ppm.
 - 3. Boron: Maintain a value between 100 to 200 ppm.
 - 4. Chemical Oxygen Demand: Maintain a maximum value of 100 ppm.
 - 5. Soluble Copper: Maintain a maximum value of 0.20 ppm.
 - 6. TSS: Maintain a maximum value of 10 ppm.
 - 7. Ammonia: Maintain a maximum value of 20 ppm.
 - 8. Free Caustic Alkalinity: Maintain a maximum value of 20 ppm.
 - 9. Microbiological Limits:

WATER TREATMENT FOR CLOSED-LOOP HYDRONIC SYSTEMS 23 25 13 - 2

- a. Total Aerobic Plate Count: Maintain a maximum value of 1000 organisms/mL.
- b. Total Anaerobic Plate Count: Maintain a maximum value of 100 organisms/mL.
- c. Nitrate Reducers: Maintain a maximum value of 100 organisms/mL.
- d. Sulfate Reducers: Maintain a maximum value of zero organisms/mL.
- e. Iron Bacteria: Maintain a maximum value of zero organisms/mL.

2.2 MANUAL CHEMICAL FEED EQUIPMENT

- A. Bypass Feeders: Steel, with corrosion resistant exterior coating, minimum 3 ½ inch fill opening in the top, and NPS ¾ bottom inlet and top side outlet. Quarter turn or threaded fill cap with gasket seal and diaphragm to lock the top on the feeder when exposed to system pressure in the vessel.
 - 1. Capacity: 2 gal.
 - 2. Minimum Working Pressure: 125 psig.

2.3 WATER METER

- A. Water Meter: Provide a positive-displacement, totalizing, electronic water meter for both chilled and hot water systems. Connection signal to the building energy management system. Coordinate connection requirements with control systems contractor.

2.4 CHEMICALS

- A. Chemicals shall be compatible with piping system components and connected equipment.

PART 3 - EXECUTION

3.1 WATER ANALYSIS

- A. Perform an analysis of the water at the project site to determine the quality.

3.2 INSTALLATION

- A. Bypass Feeders: Install in closed hydronic systems:
 - 1. Install bypass feeder in a bypass circuit around circulating pumps unless otherwise indicated on drawings.
 - 2. Install test-coupon assembly in bypass circuit around circulating pumps unless otherwise indicated on Drawings.
 - 3. Install full-port ball isolation valves on inlet, outlet, and drain below the feeder inlet.
 - 4. Install a swing check on the inlet after the isolation valve.
- B. Water Meters:

Install separate water meters in makeup-water supply lines for the chilled and hot water systems. Connect totalizing signals to the building energy management system.

3.3 CONNECTIONS

- A. Where installing piping adjacent to equipment, allow space for service and maintenance.
- B. Make piping connections between water-treatment equipment and dissimilar-metal piping with dielectric fittings.
- C. Install shutoff valves on HVAC water-treatment equipment inlet and outlet.

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- B. Perform the following tests and inspections:
 - 1. Inspect field-assembled components and equipment installation, including piping connections.
 - 2. Inspect piping and equipment to determine that systems and equipment have been cleaned, flushed, and filled with water, and are fully operational before introducing water treatment chemicals.
 - 3. Do not enclose, cover, or put piping into operation until it is tested, and satisfactory test results are achieved.
 - 4. Test for leaks and defects.
 - 5. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of pipe-mounted devices. Isolate test source and allow test pressure to stand for four hours.
 - 6. Repair leaks and defects with new materials and retest piping until no leaks exist.
- C. Equipment will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.
- E. At 3-month intervals following Substantial Completion, perform separate water analyses on hydronic systems to show that water quality is within performance requirements specified in this Section. Submit written reports of water analysis.
- F. Comply with ASTM D 3370 and with the following standards:
 - 1. Silica: ASTM D 859.
 - 2. Acidity and Alkalinity: ASTM D 1067.
 - 3. Iron: ASTM D 1068.
 - 4. Water Hardness: ASTM D 1126.

END OF SECTION

SECTION 23 52 16

FIRE-TUBE 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 as fully as if repeated here.

1.2 SUMMARY

- A. This Section includes packaged, factory-fabricated and assembled, outdoor, gas-fired, fire-tube condensing boilers, trim, and accessories for heating hot water.

1.3 SUBMITTALS

- A. Product Data: Include performance data, operating characteristics, furnished specialties, and accessories.
- B. Shop Drawings: Provide submittals for boilers, boiler trim, and accessories.
 - 1. Include plans, elevations, sections, details, and attachments to other work.
 - 2. Include weights, anchorage locations, and centers of gravity.
 - 3. Provide wiring diagrams for power, signal, and control wiring.
- C. Source quality-control test reports: Indicate and interpret test results for compliance with performance requirements before shipping.
- D. Efficiency Data Points: Data shall be submitted per ASHRAE 155 Method of Testing for Rating Commercial Space Heating Boiler Systems. This data shall cover steady state thermal efficiency, part load efficiency, and idling energy input rate. Efficiency data not supported by a third party published test standard shall not be permitted.
- E. Warranty: Standard warranty specified in this Section.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For boilers to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: The manufacturer must have been involved in the manufacture of outdoor fire-tube condensing hydronic boilers for no less than 5 years. The manufacturer must be headquartered in North America and manufacture in an ASME-certified facility.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. ASME Compliance: Fabricate and label boilers to comply with ASME Boiler and Pressure Vessel Code.
- D. ASHRAE/IESNA 90.1 Compliance: Boilers shall have minimum efficiency according to "Gas and Oil Fired Boilers - Minimum Efficiency Requirements."
- E. AHRI Compliance: Boilers shall be AHRI listed and must meet the minimum efficiency specified under AHRI BTS-2000 as defined by Department of Energy in 10 CFR Part 431.
- F. ANSI Compliance: Boilers shall be compliant with ANSI Z21.13 test standards. Boilers shall be tested in an ISO 17025 recognized laboratory.

1.6 COORDINATION

- A. Coordinate size and location of concrete equipment pads including anchor bolt location. Refer to the DSA-approved structural drawings for anchorage requirements.

1.7 WARRANTY

- A. Standard Warranty: Boilers shall include 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. Heat Exchanger, Pressure Vessel and Condensation Collection Basin shall carry a 10 year limited warranty against defects in materials or workmanship.
 - b. Heat exchangers and pressure vessels are warranted against thermal shock for the lifetime of the boiler.
 - c. The burner shall carry a five (5) year limited warranty against defective material or workmanship from the date of shipment.
 - d. All other components shall carry a one year limited warranty from date of boiler start up or 18 months from shipment if start up cannot be proven.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Lochinvar Crest Boiler, Parker Boiler, Teledyne Laars, or equal as specified on Drawings.

2.2 CONSTRUCTION

- A. Description: Boiler shall be natural gas fired, fully condensing, and fire tube design suitable for outdoor use. The boiler shall be factory-fabricated, factory-assembled, and factory-tested, fire-tube 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: The heater exchanger shall bear the ASME "H" stamp for 160 psi working pressure and shall be National Board listed. The heat exchanger shall be constructed of a fully welded 316L stainless steel interior with a carbon steel shell and of fire tube design. Fire tube shall be capable of transferring 16,000 to 20,000 Btu's per tube. The heat exchanger shall be designed for a single-pass water flow. There shall be no banding material, bolts, gaskets or "O" rings in the heat exchanger design.
- C. Condensate Collection Basin: Fully welded 316 stainless steel.
- D. Intake Filter and Dirty Filter Switch: Boiler shall include an intake air filter with a factory installed air pressure switch. The pressure switch will alert the end user on the screen of the boiler that the intake filter is dirty and needs to be changed.
- E. Pressure Vessel: The pressure vessel shall be in accordance with ASME Section IV pressure vessel code. The pressure vessel shall be designed for a single-pass water flow to limit the water side pressure drop. Pressure drop shall be no greater than 6.5 psi.
- F. Burner: Natural gas, forced draft single burner premix design. Operation of the burner shall not exceed 5.7% oxygen level or 40% excess air. The burner shall be high temperature stainless steel with a woven outer covering to provide modulating firing rates. The burner shall be capable of the stated gas train turndown without loss of combustion efficiency. The burner shall be removable from the boiler without removing the gas/air manifold. The burner shall have an independent laboratory rating for Oxides of Nitrogen (NOx) to meet requirements of the Bay Area Quality Management District (BAAQMD) as compliant with Regulation 9 Rule 7 (FB 2501 – FB 6001).
- G. Blower: Boiler shall be equipped with a pulse width modulating blower system to precisely control the fuel/air mixture to provide modulating boiler firing rates for maximum efficiency. The burner firing sequence of operation shall include pre-purge, firing, modulation, and post-purge operation.
 - 1. Motors: Comply with requirements specified in Division 23 Section "Common Motor Requirements for HVAC Equipment."

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- H. Gas Train: The boiler shall be supplied with two gas valves designed with negative pressure regulation and shall be capable of the following minimum turndowns, based on their capacity:

| Input MBH | Turndown | Minimum Input | Maximum Input |
|-----------|----------|---------------|---------------|
| 1,250 | 20:1 | 62,500 | 1,250,000 |
| 1,500 | 25:1 | 60,000 | 1,500,000 |
| 1,750 | 25:1 | 70,000 | 1,750,000 |
| 1,999 | 25:1 | 80,000 | 1,999,000 |
| 2,500 | 20:1 | 125,000 | 2,500,000 |

- I. Ignition: Spark ignition with 100 percent main-valve shutoff with electronic flame supervision. Boilers using a pilot for ignition are unacceptable.

J. Casing:

1. Jacket: Heavy gauge primed and painted steel jacket with snap-in closures. Jacket panels shall be fully removal; the front door and side panels shall not require tools for removal. The jacket shall be mounted on a steel base with a ¼” minimum thickness.
2. Control Compartment Enclosures: NEMA 4, Type 1A.
3. Insulation: Minimum ½ inch thick, mineral fiber insulation surrounding the heat exchanger.
4. Combustion-Air Connections: Inlet and vent duct collars.
5. Clearances: Boilers shall feature zero (0) clearance to combustibles. Boilers shall have the ability to be placed side by side in multiples with no clearance in between if necessary. Local codes should be considered.

- K. Outdoor Capability: Boilers shall be capable of operating outdoors, without compromising certified boiler performance, operation or warranty.

- L. Rigging and Placement: Boiler shall include lifting lugs and fork truck accessibility for rigging.

M. Characteristics and Capacities:

1. Heating Medium: Hot water.
2. Design Water Pressure Rating: 160 psi working pressure.
3. Safety Relief Valve Setting: 50 psig
4. Minimum Water Flow Rate: In accordance with the table below:

| Input MBH | Minimum Flow |
|-----------|--------------|
| 750 | 18 gpm |
| 999 | 18 gpm |
| 1,250 | 18 gpm |
| 1,500 | 25 gpm |
| 1,750 | 25 gpm |
| 1,999 | 25 gpm |
| 2,500 | 25 gpm |

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2.3 TRIM

- A. Safety Relief Valve:
 - 1. Size and Capacity: 50 lb.
 - a. System pressures should be confirmed.
 - b. Custom relief valve sizes can be ordered.
 - 2. Description: Fully enclosed steel spring with adjustable pressure range and positive shutoff; factory set and sealed.
- B. Pressure Gage: Minimum 3-1/2 inch diameter. Gauge shall have normal operating pressure about 50 percent of full range.
- C. Drain Valves: Minimum NPS 3/4 or nozzle size with hose-end connection.
- D. Condensate Trap: Factory supplied condensate trap with condensate trip sensor.

2.4 CONTROLS

- A. Refer to Division 23 Section "Instrumentation and Control."
- B. Boiler controls shall feature the following standard features:
 - 1. 8" LCD screen display displaying status, modulation percentage, setpoints, and sensor data at a minimum on the home screen. Additional information such as history and parameters can be accessed via the touchscreen display without the need for navigation buttons. A screen saver mode shall be available with the display.
 - 2. Variable Speed Boiler Pump Control: Boiler may be programmed to send a 0-10V DC output signal to an ECM or VFD boiler pump to maintain a designed temperature rise across the heat exchanger. The boiler shall be able to operate in this mode with a minimum temperature rise of 20 degrees F and a maximum temperature rise of 60 degrees F.
 - 3. Password Security: Boiler shall have a different password security code for the Owner and Contractor to access adjustable parameters.
 - 4. Outdoor air reset: Boiler shall calculate the set point using a field installed, factory supplied outdoor sensor and an adjustable reset curve.
 - 5. Pump exercise: Boiler shall energize any pump it controls for an adjustable time if the associated pump has been off for a time period of 24 hours.
 - 6. Ramp delay: Boiler may be programmed to limit the firing rate based on six limits steps and six time intervals.
 - 7. Boost function: Boiler may be programmed to automatically increase the set-point a fixed number of degrees (adjustable by installer) if the setpoint has been continuously active for a set period of time (time adjustable by installer). This process will continue until the space heating demand ends.

8. PC port connection: Boiler shall have a PC port allowing the connection of PC boiler software.
 9. Time clock: Boiler shall have an internal time clock with the ability to time and date stamp lock-out codes and maintain records of runtime.
 10. Service reminder: Boiler shall have the ability to display a yellow colored service notification screen based upon months of installation, hours of operation, and number of boiler cycles. All notifications are adjustable by the installer.
 11. Two pump control: Boiler shall have the ability to control the boiler pump and system pump.
 12. Anti-cycling control: Boiler shall have the ability to set a time delay after a heating demand is satisfied, allowing the boiler to block a new call for heat. The boiler will display an anti-cycling blocking on the screen until the time has elapsed or the water temperature drops below the anti-cycling differential parameter. The anti-cycling control parameter is adjustable by the installer.
 13. Night setback: Boiler may be programmed to reduce the space heating temperature set point during a certain time of the day.
 14. Freeze protection: Boiler shall turn on the boiler and system pumps when the boiler water temperature falls below 45 degrees. When the boiler water temperature falls below 37 degrees the boiler will automatically turn on. Boiler and pumps will turn off when the boiler water temperature rises above 43 degrees.
 15. Isolation valve control: Boiler shall have the ability to control a 2-way motorized control valve. Boilers shall also be able to force a fixed number of valves to always be energized regardless of the number of boilers that are firing.
 16. BMS integration with 0-10V DC input: The Control shall allow an option to enable and control set point temperature or control firing rate by sending the boiler a 0-10V input signal.
 17. Data logging: Boiler shall have non-volatile data logging memory including last 10 lockouts, hours running and ignition attempts and should be able to view on boiler screen.
- C. The boiler shall have a built in Cascade controller to sequence and rotate lead boiler to ensure equal runtime while maintaining modulation of up to 8 boilers of different btu inputs without utilization of an external controller. The factory installed internal cascade controller shall include:
1. Lead lag: The Control module shall minimize the number of boilers firing to achieve the heating load.
 2. Efficiency optimization: The Control module shall allow multiple boilers to fire at minimum firing rate in lieu of lead/lag.
 3. Rotation of lead boiler: The boiler control module shall change the lead boiler every hour for the first 24 hours after initializing the Cascade. Following that, the leader will be changed once every 24 hours.
 4. Redundancy: The boiler control module shall have a built in feature to continue operating with follow boilers if the Lead boiler is not operational.

- D. Boiler operating controls shall include the following devices and features:
1. Set-Point Adjust: Set points shall be adjustable.
 2. Operating Pressure Control: Factory wired and mounted to cycle burner.
 3. Sequence of Operation: Factory installed controller to modulate burner firing rate to maintain system water temperature in response to call for heat.
 4. Sequence of Operation: Electric, factory-fabricated and factory-installed panel to control burner firing rate to reset supply-water temperature inversely with outside-air temperature. At 40 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 140 deg F.
- E. Burner Operating Controls: To maintain safe operating conditions, burner safety controls limit burner operation.
1. High Temperature Limit: Automatic and manual reset stops burner if operating conditions rise above maximum boiler design temperature. Limit switch to be manually reset on the control interface.
 2. Low-Water Cutoff Switch: Electronic probe shall prevent burner operation on low water. Cutoff switch shall be manually reset on the control interface.
 3. Blocked Inlet Safety Switch: Manual-reset pressure switch field mounted on boiler combustion-air inlet.
 4. High and Low Gas Pressure Switches: Pressure switches shall prevent burner operation on low or high gas pressure. Pressure switches to be manually reset on the control interface.
 5. Proof of Closure Valve: Proof of closure valve shall prevent the boiler from firing if the POC valve seat is detected open. Upon a call for heat, once the POC valve seat is proven to be closed, the pre-purge cycle will begin and the POC valve will begin to open.
 6. Blocked Drain Switch: Blocked drain switch shall prevent burner operation when tripped. Switch to be manually reset on the control interface.
 7. Low air pressure switch: Pressure switches shall prevent burner operation on low air pressure. Switch to be manually reset on the control interface.
 8. Audible Alarm: Factory mounted on control panel with silence switch; shall sound alarm for any lockout conditions.
- F. Building Automation System Interface: Factory installed Modbus and BACnet MSTP gateway interface to enable building automation system to monitor, control, and display boiler status and alarms.
1. Coordinate with controls contractor to determine if BACnet IP or Lon Works gateways are preferred.
- G. Software Update: The control shall have the ability to receive updates in the field without hardware component replacement. This update can be performed via USB flash drive, internet connection, or via wireless connection. This service shall be provided at no additional and/or annual cost to the owner.

- H. Connecting Remotely: Provide the ability to connect to boiler controls remotely and allow a mobile device to monitor and control boiler functionality. Provide Wi-Fi or hardwired Ethernet connection. Coordinate with the controls contractor prior to construction.

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 factory-wired switches, motor controllers, transformers, and other electrical devices necessary shall provide a single-point field power connection at the boiler.
- C. Electrical Characteristics: See the drawings for electrical service required.

2.6 VENTING

- A. Boiler shall come standard with a flue sensor to monitor and display flue gas temperature on factory provided LCD display.

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 of piping and electrical connections.

3.2 BOILER INSTALLATION

- A. Install gas-fired boilers according to NFPA 54.

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- B. Assemble and install boiler trim.
- C. Install electrical devices furnished with boiler but not specified to be factory mounted.
- D. Install control wiring to field-mounted electrical devices.

3.3 CONNECTIONS

- A. Install boilers level on concrete bases.
- 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.
- D. Connect gas piping to boiler gas-train inlet with union. Piping shall be at least full size of equipment connection. Provide a reducer. Gas regulators shall also be installed. Provide a 2 psi gas regulator.
- E. Connect hot water piping to supply and return boiler tapings with shutoff valve and union or flange at each connection.
- F. Install piping from safety relief valves to nearest floor drain.

3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
 - 1. 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. Complete startup form included with boiler and return to manufacturer as described in the 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. 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.

D. 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.
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. Perform a combustion analysis after installation and adjust gas valve per the installation and operations manual and note in startup report.
9. Document test results in a report and submit to Architect.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative for boiler startup and to train Owner's maintenance personnel to adjust, operate, and maintain boilers.

END OF SECTION

SECTION 23 64 23

AIR-COOLED SCROLL WATER CHILLERS

PART 1 - GENERAL

1.1 CONDITIONS AND REQUIREMENTS

- A. General: All provisions of the General Conditions, Supplementary Conditions, Notice to Bidders, other front-end documents, Division 1 Specifications, other Divisions of the Specifications, and all drawings apply to the work of this Section as fully as if repeated here.
- B. The work of this Division includes but is not necessarily limited to furnishing and installing air-cooled water chillers as indicated in the drawings, as specified herein, and as required to complete the work.

1.2 RELATED WORK

- A. Section 23 05 48, Vibration and Seismic Control for HVAC Piping and Equipment.

1.3 REFERENCES

- A. AHRI 550/590 - Standard for Water Chilling Packages using the Vapor Compression Cycle
- B. AHRI 370 - Sound Rating of Large Outdoor Refrigerating and Air-Conditioning Equipment
- C. ASHRAE 15 - Safety Code for Mechanical Refrigeration
- D. ASHRAE 90.1 - Energy Efficient Design of New Buildings
- E. UL 60335-2-40 - Central Cooling Air Conditioners
- F. ASTM B117 - Standard Method of Salt Spray (Fog) Testing
- G. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- H. ASTM A525 - Zinc (Hot-Dip Galvanized) Coatings on Sheet Steel Products
- I. ASTM D1654 - Evaluation of Painted or Coated Specimens, Subjected to Corrosive Environments
- J. ANSI/AFBMA 9-1978 - Load Ratings and Fatigue Life for Ball Bearings.
- K. ISO 9001
- L. California Administrative Code - Title 24

1.4 SUBMITTALS

- A. Submit dimensional plan and elevation view drawings, weights and loadings, required clearances, location and size of all field connections, electrical requirements and wiring diagrams.

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- B. Provide submittals for all equipment and materials. Submittals include, but are not limited to:
1. Manufacturer's name and model number.
 2. Equipment identification as referenced in the documents.
 3. Shop drawings showing dimensions, weights, point loadings, locations for mounting bolt holes, locations and sizes of field connections, and required clearances.
 4. Materials of construction.
 5. Capacities and ratings.
 6. Pump curves with operating points clearly indicated. For parallel pump applications, indicate the operating point of the combined case and the operating point of only one pump.
 7. Motor data.
 8. Electrical requirements, wiring diagrams.
 9. Manufacturer's installation instructions.
 10. Startup instructions, maintenance data, parts lists, and accessories.
 11. Manufacturer's warranty. Ensure forms have been filled out in the Owner's name and registered with the manufacturer.

1.5 REGULATORY REQUIREMENTS

- A. Comply with codes and standards specified.
- B. Chiller must be built in an ISO 9001 classified facility.

1.6 VERIFICATION OF CAPACITY AND EFFICIENCY

- A. All proposals for chiller performance must include an AHRI approved selection method. Verification of date and version of computer program selection or catalog is available through AHRI.

1.7 DELIVERY, HANDLING AND STORAGE

- A. Comply with manufacturer's installation instructions for rigging, unloading, and transporting chillers.
- B. Chiller shall be capable of withstanding -40°F to 158°F storage temperatures for an indefinite period of time.

1.8 WARRANTY

- A. Provide a full parts warranty for one year from start-up or 18 months from shipment, whichever occurs first.
- B. 1st year labor warranty whole unit
- C. 1st year refrigerant warranty

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Trane Model ACS, Carrier, Johnson Controls, or equal.

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- B. Water chillers must have scroll compressors and meet the specifications including all scheduled performance.

2.2 CHILLER DESCRIPTION

- A. The contractor shall furnish and install air-cooled water chillers with scroll compressors as shown as scheduled on the contract documents. The chillers shall be installed in accordance with this specification and perform at the specified conditions as scheduled.

2.3 CHILLER OPERATION

- A. Chiller shall be capable of starting and running at outdoor ambient temperatures from 32°F to 115°F.
- B. Chiller shall be capable of starting up with 95°F entering fluid temperature to the evaporator. The maximum water temperature that can be circulated with the chiller not operating is 125°F (52°C)
- C. Chiller shall provide evaporator freeze protection and low limit control to avoid low evaporator refrigerant temperature trip-outs during critical periods of chiller operation. Whenever this control is in effect, the controller shall indicate that the chiller is in adaptive limit. If the condition exists for more than 30 seconds, a limit warning alarm relay shall energize.
- D. The chiller shall be capable of automatically starting in 45 seconds after power has been restored.

2.4 COMPRESSORS

- A. Construct chillers using fully hermetic scroll type compressors with R454B optimized and dedicated scroll profile. Refrigerant shall have a GWP of less than 600.
- B. Provide direct drive motor cooled by suction gas with only three major moving parts and a completely enclosed compression chamber which leads to increased efficiency.
- C. Each compressor shall have Intermediate Discharge Valves (IDV) or variable volume ratio technology.
- D. Each compressor shall have overload protection internal to the compressor.
- E. Each compressor shall include oil level sight glass and oil charging valves.
- F. Each compressor will have crankcase heaters installed and properly sized to minimize the amount of liquid refrigerant present in the oil sump during off cycles.

2.5 EVAPORATOR

- A. The evaporator shall be a high efficiency, brazed plate-to-plate type heat exchanger consisting of parallel plates. Brazed plates shall be stainless steel with copper braze material.
- B. The water side working pressure shall be rated at 150 psig (10.3 bar) and tested at 1.5 times maximum allowable water side working pressure.

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- C. The refrigerant side working pressure shall be rated at 650 psig (44.8 bar) and tested at 1.1 times the maximum allowable refrigerant side working pressure.
- D. Insulate the evaporator with a minimum of 0.75 inch (K=0.28) UV rated insulation.
- E. Evaporator heaters shall be factory installed and shall protect chiller down to -20°F. Contractor shall wire separate power to energize heat tape and protect evaporator while chiller is disconnected from the main power.
- F. Provide water drain connection, vent and fittings. Factory installed leaving water temperature control and low temperature cutout sensors.
- G. Water connections shall be grooved pipe.
- H. Proof of flow shall be provided by the equipment manufacturer, mechanically installed and electrically wired, at the factory of origin.

2.6 FANS

- A. Low sound fans shall be balanced and direct driven.
- B. All condenser fan TEAO motors have permanently lubricated ball bearings and internal overload protection.
- C. All condenser fans are electrically commutated motors to provide variable speed for optimized efficiency and lower part load sound.

2.7 CONDENSER

- A. Construct condenser coils with all-aluminum brazed fins. The condenser coils shall have an integral sub-cooling circuit and shall be designed for at least 650 psig working pressure. Leak tested at 650 psig. Coils can be cleaned with high pressure water.
- B. Condenser coils shall be transverse design. If coils are not transverse design, provide coil protection for shipping.

2.8 ENCLOSURES/CHILLER CONSTRUCTION

- A. Unit panels, structural elements and control boxes are constructed of galvanized steel and mounted on a bolted galvanized steel base. Unit panels, control boxes and the structural base are finished with a baked on powder paint.
- B. Control panel doors shall have door stays.
- C. Mount starters and Terminal Blocks in a UL 60335-2-40 rated weatherproof panel provided with full opening access doors. If a circuit breaker is chosen, it should be a lockable, through-the-door type with an operating handle and clearly visible from outside of chiller indicating if power is on or off.
- D. The coating or paint system shall withstand 500 hours in a salt-spray fog test in accordance with ASTM B117.

2.9 ELECTRICAL

- A. The starter shall be across-the-line configuration, factory-mounted and fully pre-wired to the compressor motor(s) and control panel.
- B. Unit shall have a single point power connection.
- C. Power line connection type shall be standard with a terminal block.
- D. A control power transformer shall be factory-installed and factory-wired to provide unit control power.
- E. Unit wiring shall run in liquid-tight conduit.
- F. High short circuit current rating (SCCR) of 10kA.
- G. Under/Over Voltage Protection.

2.10 REFRIGERANT CIRCUIT

- A. All chillers shall have 2 refrigeration circuits, each with two or three manifolded compressors on each circuit.
- B. Provide for each refrigerant circuit:
 - 1. Liquid line shut off valve.
 - 2. Discharge service valve.
 - 3. Filter drier with a replaceable core.
 - 4. Liquid line sight glass.
 - 5. Electronic expansion valve sized for maximum operating pressure.
 - 6. Charging valve.
- C. Full operating charge of R454B and oil.

2.11 CONTROLS

- A. A color, touch-sensitive LCD display shall be unit mounted. The screen size shall be a minimum of 7" diagonal.
- B. Display shall consist of a menu driven interface with easy touch screen navigation to organized sub-system reports for compressor and evaporator information as well as associated diagnostics.
- C. The chiller control panel shall provide password protection of all setpoints with configurable user settings for each user.
- D. The controller shall have the ability to display all primary sub-system operational parameters on dedicated trending graphs. The operator must be able to create up to 6 additional custom trend graphs, choosing up to 10 unique parameters for each graph to trend log data parameters simultaneously over an adjustable period and frequency polling.

- E. Chilled water temperature control shall be microprocessor-based, proportional and integral controller to show water and refrigerant temperature, refrigerant pressure, and diagnostics. The microprocessor-based controller is to be supplied with each chiller by the chiller manufacturer.
- F. The front of the chiller control panel shall display the following in clear language, without the use of codes, look-up tables, or gauges:
 - 1. Run time.
 - 2. The number of compressor starts.
 - 3. Current chiller operating mode.
 - 4. Chilled water set point and set point source.
 - 5. Demand current limit set point and set point source.
 - 6. Entering and leaving evaporator water temperatures.
 - 7. Saturated evaporator and condenser refrigerant temperatures.
 - 8. Evaporator and condenser refrigerant pressure.
 - 9. Phase reversal/unbalance/single phasing and over/under voltage protection.
 - 10. Low chilled water temperature protection.
 - 11. High and low refrigerant pressure protection.
 - 12. Load limit thermostat to limit compressor loading on high return water temperature.
 - 13. Condenser fan sequencing to automatically cycle fans in response to load, expansion valve pressure, condenser pressure, and differential pressure to optimize chiller efficiency.
 - 14. Display diagnostics.
 - 15. Compressors: Status (on/off), anti-short cycle timer, and automatic compressor lead-lag.
- G. A weatherproof control panel shall be mounted on the chiller, containing starters, power and control wiring, factory-wired with terminal block power connection. Provide primary and secondary fused control power transformers.
- H. The chiller controller shall utilize a microprocessor that will automatically take action to prevent chiller shutdown due to abnormal operating conditions associated with evaporator refrigerant temperature, high condensing pressure, and motor current overload.
- I. Provide the following safety controls with indicating lights or diagnostic readouts:
 - 1. Low chilled water temperature protection.
 - 2. High refrigerant pressure.
 - 3. Loss of chilled water flow.
 - 4. Contact for remote emergency shutdown.
 - 5. Motor current overload.
 - 6. Phase reversal/unbalance/single phasing.
 - 7. Over/under voltage.
 - 8. Failure of water temperature sensor used by controller.
 - 9. Compressor status (on or off).
- J. Provide the following operating controls:
 - 1. A variable compressor staffing method to control capacity in order to maintain leaving chilled water temperature based on PI algorithms. Five minute solid state anti-recycle timer to prevent compressor from short cycling. Compressor minimum stop-to-start time

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- limit shall be 2 minutes. If a greater than 5 minute start-to-start, or greater than 2 minute stop-to-start timer is included.
2. Chilled water pump output relay that closes when the chiller is given a signal to start.
 3. Load limit thermostat to limit compressor loading on high return water temperature to prevent nuisance trips.
 4. High ambient unloader pressure controller that unloads compressors to keep head pressure under control and help prevent high pressure nuisance trips on days when outside ambient is above design.
 5. Low ambient lockout control with adjustable setpoint.
 6. Condenser fan sequencing which adjusts the speed of all fans automatically in response to ambient, condensing pressure and expansion valve pressure differential thereby optimizing chiller efficiency.
- K. Provide user interface on the front of the panel. If the display is on the inside of the panel, then a control display access door shall be provided to allow access to the display without removal of panels. Provide user interface with a minimum of the following features:
1. Leaving chilled water setpoint adjustment from the front panel touchscreen display.
 2. Entering and leaving chilled water temperature output.
 3. Pressure output of condenser.
 4. Pressure output of evaporator.
 5. Ambient temperature output.
 6. Demand limit setpoint adjustment from the front panel touchscreen display.
- L. The chiller control panel shall provide leaving chilled water temperature reset based on return water temperature.
- M. Service pump-down control.
- N. Configurable users.
- O. Multiple languages selectable.
- P. Metric conversions.
- Q. Digital communications to BAS system shall consist of a BACnet MS/TP interface via a single twisted pair wiring.
- 2.12 SOUND
- A. Acoustics: Manufacturer must provide both sound power and sound pressure data in decibels, per AHRI 370. A-weighted sound pressure at 30 feet should be provided at 100%, 75%, 50% and 25% load points to identify the full operational noise envelope.
 - B. If manufacturer cannot meet the noise levels, sound attenuation devices and/or barrier walls must be installed to meet this performance level.

PART 3 - EXECUTION

3.1 INSTALLATION

AIR-COOLED SCROLL WATER CHILLERS 23 64 23 - 7

- A. Install the chiller in accordance with the manufacturer's requirements.
 - 1. Level the chiller using the base rail as a reference. The chiller must be level within 1/2 in over the entire length and width. Use shims as necessary to level the chiller.

3.2 SERVICE AND START-UP

- A. Chiller Startup: Provide all labor and materials to perform startup. Startup shall be performed by a factory-trained technician from the original equipment manufacturer (OEM). The technician shall confirm that equipment has been correctly installed and passes specification checklist prior to equipment becoming operational and covered under OEM warranty. This shall be done in strict accordance with the manufacturer's specifications and requirements. Third-party service agencies are not permitted.
- B. A start-up log shall be furnished by the factory approved start-up technician to document the chiller's start-up date and shall be signed by the Owner or his authorized representative prior to commissioning the chillers.
- C. Chiller manufacturers shall maintain service capabilities no further than 50 miles from the jobsite.
- D. Provide a local service agent with direct access to factory support.
- E. The service provider shall employ full time, competent HVAC and automation system service technicians on staff, whose office in which they operate from is within 50 miles from the job site.
- F. During the first 12 months of operation, a factory-trained technician from the original equipment manufacturer (OEM) shall perform quarterly on-site operating inspections to confirm the chiller's operational performance. The manufacturer shall provide the owner with a report describing the condition of the equipment, current operating log, any issues found needing to be addressed, and recommended corrective actions.

END OF SECTION

SECTION 260500

COMMON WORK RESULTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 01 Specification Sections, and Section 260010 "General Requirements for Electrical Systems" apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Slotted Support Systems.
2. Conduit and Cable Supports.
3. Mounting, Anchoring, and Attachment Components.
4. Fabricated Metal Supports.
5. Concrete Bases.
6. Vibration Isolation pads.
7. Sleeves for penetration of non-fire-rated construction walls and floors.
8. Sleeve-seal systems.
9. Firestopping.
10. Cutting and Patching
11. Painting

1.3 REFERENCES

- A. Abbreviations and Acronyms

1. EMT: Electrical Metallic Tubing.
2. FMC: Flexible Metal Conduit.
3. GRC/GRS: Galvanized Rigid Steel Conduit.
4. LFMC: Liquid-tight flexible metal conduit.
5. RMC: Rigid Metal Conduit

- B. Definitions

1. Channel: A continuous slotted channel (strut) with inturned lips suitable for assembly into multiple configurations

COMMON WORK RESULTS FOR ELECTRICAL SYSTEMS 26 05 00 - 1

- C. Reference Standards: The following publications are referred to in the text by the basic designation only. The edition/revision of the referenced publications shall be the latest version as of the date of the Contract Documents, unless otherwise specified.
 - 1. Metal Framing Manufacturers Association (MFMA)
 - a. MFMA-4: Metal Framing Standards Publication
 - b. MFMA-103: Guidelines for the use of Metal Framing

1.4 SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of components, profiles, and finishes.
 - 2. Include rated capacities.
- B. Shop Drawings: For fabrication and installation details and include calculations for the following:
 - 1. Slotted channel systems.
 - 2. Equipment supports.
 - 3. Concrete Bases for Equipment.
 - 4. Vibration Isolation Base Details: Detail fabrication, including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency acceptable to the authority having jurisdiction, and marked for intended location and application.

2.2 SLOTTED SUPPORT SYSTEMS

- A. Description: Preformed, continuous slot, bolted channels with associated fittings and hardware.
 - 1. Available Manufacturers: Subject to compliance with requirements, provide products from one of the following or an approved equal:
 - a. Eaton B-Line.

COMMON WORK RESULTS FOR ELECTRICAL SYSTEMS 26 05 00 - 2

- b. Kindorf.
 - c. nVent Caddy.
 - d. Power-Strut.
 - e. SuperStrut.
 - f. Unistrut.
- 2. Comply with MFMA-4 for factory fabricated components suitable for field assembly.
- 3. Material and Finish for channel, fittings, and accessories:
 - a. Steel: Minimum 16 gauge, Hot-dip galvanized after fabrication and applied according to ASTM A123 or A153 suitable for indoor or outdoor wet locations.
 - b. Stainless Steel (type 316) per ASTM A276 suitable for corrosive environments.
 - c. Fiberglass: UV-resistant, fire retardant, fiberglass-reinforced polyester resin suitable for corrosive environments.
- 4. Channel Dimensions: Minimum 1-5/8 inches wide with varying heights and welded combinations selected to meet applicable load criteria.

2.3 CONDUIT AND CABLE SUPPORTS

- A. Available Manufacturers: Subject to compliance with requirements, provide products from one of the following or an approved equal:
 - 1. Eaton B-Line
 - 2. nVent Caddy
 - 3. Thomas & Betts
- B. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- C. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Provide plugs with number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported.
- D. Device Box Mounting Brackets: Factory-fabricated sheet steel brackets for support of device boxes adjacent to or between studs.
- E. Through-Stud Cable and Raceway Support Clips: Factory-fabricated spring steel clip for cables or raceways where run horizontally through metal studs.
- F. Roof-mounted Raceway Support Blocking: Non-penetrating, factory-fabricated support blocking for use under roof-mounted raceways. Wedge-shaped blocking constructed of 100% recycled UV-resistant Rubber with integral galvanized steel strut to accept raceway support clips.
- G. Tee Bar Grid Box Hanger: Factory-fabricated metal electrical box hanger for supporting boxes at locations between ceiling system t-grid components. Height adjustable for various electrical box depths. Attached to ceiling tee bar with screws or integral clamp for stability. Includes tab for independent support wire attachment.

COMMON WORK RESULTS FOR ELECTRICAL SYSTEMS 26 05 00 - 3

2.4 MOUNTING, ANCHORING, AND ATTACHMENT COMPONENTS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Eaton B-Line
 - 2. Empire Industries.
 - 3. Hilti.
 - 4. ITW.
 - 5. MKT Fastening.
- B. Description: Items for fastening electrical items or their supports to building surfaces include the following:
 - 1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened Portland cement concrete, or steel with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - 2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated or stainless steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
 - 3. Concrete Inserts: Steel, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
 - 4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
 - 5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM F 3125, GRADE A325.
 - 6. Toggle Bolts: All-steel springhead type.
 - 7. Hanger Rods: Solid, threaded steel.

2.5 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Division 05 Section "Metal Fabrications" for steel shapes and plates.

2.6 VIBRATION ISOLATION PADS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Korfund Maxi-Flex Pads or a comparable product by one of the following:
 - 1. Ace Mountings Co.
 - 2. California Dynamics Corporation.
 - 3. Eaton B-Line.
 - 4. Kinetics Noise Control.
 - 5. Mason Industries.
 - 6. Vibration Eliminator Co.

COMMON WORK RESULTS FOR ELECTRICAL SYSTEMS 26 05 00 - 4

7. VMC Group

- B. Description: Molded, oil resistant, non-skid elastomeric pads arranged in 2-inch square segments.
- C. Size: Factory or field cut to match requirements of supported equipment.
- D. Load Rating from 120 lbs. up to 360 lbs. per 2-inch segment.

2.7 SLEEVES

A. Wall and Floor Sleeves:

- 1. Galvanized Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, plain ends.

2.8 SLEEVE-SEAL SYSTEMS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable. Link Seal system or approved equal.

- 1. Sealing Elements: EPDM rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
- 2. Pressure Plates: Glass reinforced nylon polymer.
- 3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

2.9 FIRESTOPPING FOR ELECTRICAL SYSTEMS

A. Manufacturers: Subject to compliance with requirements, provide products from one of the following or approved equal:

- 1. Hilti
- 2. Specified Technologies Inc (STI)
- 3. Wiremold

B. Source Limitations: Obtain firestopping systems through one source from a single manufacturer.

C. General Requirements:

- 1. Firestopping systems shall bear UL classification marking corresponding to its Fire Resistance Directory.
- 2. Comply with testing requirements set forth in ASTM E814 or UL 1479.
- 3. Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.

COMMON WORK RESULTS FOR ELECTRICAL SYSTEMS 26 05 00 - 5

4. Provide components for each through-penetration firestop system that are needed to install fill materials. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.
- D. Fire rated cable pathways: Re-penetrable, maintenance-free cable management devices for use with cable bundles penetrating through fire rated walls or floors.
 1. Shall contain a built-in fire sealing system sufficient to maintain the hourly rating of the fire rated wall or floor being penetrated.
 2. The system shall adjust to the installed cable loading and shall permit cables to be installed, removed, or retrofitted without the need to remove or reinstall firestop materials.
 3. Shall be engineered to allow two or more devices to be ganged together with wall plates for larger cable capacities.
 - E. Fire-rated cable grommets: Molded, two-piece grommet with sealing membrane for use with single cables or small bundles at through or membrane wall penetrations.
 1. System shall be installed around cables and shall lock tightly into the wall assembly.
 - F. Outlet Box Putty Pads: Non-hardening, moldable, intumescent material shaped into preformed pads for use with metallic outlet boxes.
 - G. Refer to Division 07 for requirements related to other firestopping systems and materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and equipment to receive vibration isolation devices for compliance with manufacturer's installation requirements for installation tolerances and other conditions affecting performance.
- B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.
- C. Examine substrates and conditions for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 CUTTING AND PATCHING

- A. Unless otherwise indicated, provide cutting and patching necessary to install the work specified. Patching shall match adjacent surfaces to the satisfaction of the Engineer and shall be in accordance with the Architect's standards for such work.

COMMON WORK RESULTS FOR ELECTRICAL SYSTEMS 26 05 00 - 6

- B. Do not cut structural elements without reinforcing the structure to maintain the designed weight bearing and stiffness. Coordinate approved reinforcement method with Architect and Structural Engineer.
- C. When installing electrical work in insulated concrete form (ICF) walls, provide spray foam insulation to patch the insulated form and maintain the integrity of the insulation value after the work is complete. Work shall not be installed in the concrete center of the wall. All work shall be installed on the interior side of the concrete.

3.3 SUPPORT SYSTEM APPLICATION

- A. Comply with NFPA 70, NECA 1, NECA 101, and MFMA-103 for application of hangers and supports for electrical equipment and systems except where requirements of this Section are more stringent.
- B. Maximum Horizontal and Vertical Support Spacing for Raceway(s): Space supports for raceways as required by NFPA 70.
- C. Minimum Hanger Rod Size for Raceway Supports: 3/8-inch diameter unless noted otherwise.
- D. Single Raceways:
 - 1. For Raceways 1-1/4-inch and smaller: Install adjustable steel band hanger suspended on threaded rod.
 - 2. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/4-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.
- E. Multiple Raceways and single raceways larger than 1-1/4-inch:
 - 1. Install trapeze-type supports fabricated with slotted support system suspended on threaded rods for horizontal applications and fastened to building structure for vertical applications.
 - 2. Size so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 - 3. Secure raceways and cables to these supports with two-bolt steel conduit clamps or single-bolt steel conduit clamps using spring friction action for retention in support channel.

3.4 SUPPORT SYSTEM INSTALLATION

- A. Comply with NFPA 70, NECA 1, NECA 101, and MFMA-103 for installation requirements except where requirements of this Article are more stringent.
- B. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components multiplied by a safety factor of four with a minimum of 200 lbs.

COMMON WORK RESULTS FOR ELECTRICAL SYSTEMS 26 05 00 - 7

- C. Mounting and Anchorage of Surface-Mounted or Recessed-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
1. To Wood: Fasten with lag screws or through bolts.
 2. To New Concrete: Bolt to concrete inserts.
 - a. Where support anchors are required, establish their type and locate in concrete construction before concrete is poured. Fit each hanger rod with a nut at its upper end, and set nut in a universal concrete insert in the form. Where supported weight exceeds holding strength of a single insert, pass rods through top slot of inserts and interlock with reinforcing steel. Also, where particularly heavy loads are to be supported, suspend hanger rod or rods from a structural angle spanning two or more inserts and securely bolted thereto to distribute the weight.
 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 4. To Existing Concrete: Self-drilling concrete anchors or expansion anchor fasteners.
 5. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69 or Spring-tension clamps.
 6. To Light Steel: Sheet metal screws.
 7. For Surface-Mounted Items on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to structure. Attachment to gypsum wall board is not acceptable as sole support means; slotted-channel rack solidly attached to structure or light-gauge metal framing at both ends is required.
 8. For Recessed-Mounted Items in Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices to intermediate light-gauge metal framing members on each side of device or provide slotted-channel racks within hollow wall attached to structure by means that meet anchorage requirements. Attachment to gypsum wall board is not acceptable as sole support means.
- D. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars or existing raceways embedded in slab. Verify reinforcing locations with Structural Engineer and X-Ray existing concrete structures as required.
- E. Do not support any items (equipment, piping, conduit, etc.) exceeding 2 inches in diameter from the bottom of slabs. Where intermediate supports are required between structural members, use slotted steel channels support systems attached to beams or joists in order to avoid attachment to slabs.
- F. Slotted Support Systems
1. Install slotted channel systems level and plumb.
 2. Remove burrs from all exposed cut edges prior to installation.
- G. Wall Stud and Ceiling Supports
1. Fasten junction, pull and devices boxes securely to the building construction, independent of raceway system.

COMMON WORK RESULTS FOR ELECTRICAL SYSTEMS 26 05 00 - 8

2. Install Device Box Mounting Brackets supported between two studs. Attach all device boxes to two studs, device box stabilizers are prohibited.
 3. Install Tee Bar Grid Box Hanger supported between two ceiling grid tee bars where devices boxes are located flush in recessed suspended ceilings. Install at least one independent support rod from box hanger to structure.
 4. Install Through-Stud Cable and Raceway Support Clips where cables or raceways run horizontally through metal studs.
- H. Install Roof-mounted Raceway Support Blocking where raceways run on across roofing.
1. Coordinate installation of roof supports with items specified in Division 07 Section "Roof Accessories." Provide products compatible with rooftop materials included in the Work to maintain warranty of roof system.
- I. Threaded Rod Hardware
1. Provide minimum of two lock nuts per threaded support rod except where lock nut tightens against a threaded socket, one locknut may be used.
 2. Trim rod excess to within 1-inch of locknut, de-burr, and provide protective endcap.
- J. Support raceways at a distance above suspended ceilings to permit removal of ceiling panels and luminaires.
- K. Locate raceways and supports so as not to hinder function or code required clearance to any system or equipment.
- L. Provide independent supports and hang all electrical raceways and devices from the building structure with UL listed and approved materials. Utilizing the support systems of other trade's work is prohibited, except with written approval from the Engineer.
- M. Provide riser support clamps for vertical conduit runs and install at each floor level penetration and at additional locations required to support weight of system.
- N. Tighten all bolted connections to proper torque values in accordance with manufacturer's written instructions.
- O. Provide supports to maintain 1/4-inch air space between raceway and mounting surface where raceways are mounted exposed in wet or corrosive locations and where directly attached to concrete or masonry.
- P. The use of tie wire or perforated metal tape for support or fastening of any raceway system is prohibited.
- Q. Where galvanized wire is used for cable supports above suspended ceilings, provide minimum #12 support wire independent of ceiling system secured at both ends. Paint or provide tag to distinguish supports from ceiling system.
- R. Welding directly on raceways, fittings, or outlet boxes is prohibited.

COMMON WORK RESULTS FOR ELECTRICAL SYSTEMS 26 05 00 - 9

3.5 INSTALLATION OF VIBRATION ISOLATION PADS

- A. Select vibration device load ratings to match equipment loading and deflection criteria.
- B. Arrange pads in single or multiple layers of sufficient stiffness for uniform loading.
- C. Install pre-cut segments in accordance with manufacturer recommendations to match shape of equipment base.

3.6 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Division 05 Section "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

3.7 CONCRETE EQUIPMENT BASES

- A. Housekeeping Pads: Construct concrete housekeeping pads a minimum of 4-inches thick and 6-inches larger in both directions than supported unit.
- B. Exterior Equipment Pads: Construct exterior equipment pads a minimum of 8-inches thick and 6-inches larger in both directions than supported unit unless noted otherwise.
- C. Use 4000-psi, 28-day compressive-strength concrete unless otherwise noted. Comply with Division 03 Section "Cast-in-Place Concrete" and ACI standards for subbase requirements, concrete materials, reinforcement, placement, and cover requirements.
 - 1. Reinforce pads with a minimum #4 rebar on 12-inch centers each way or equivalent welded wire fabric. Support reinforcement and tie together to prevent displacement during construction.
 - 2. For interior pads, provide #4 dowels at 24-inch centers each way (minimum of 4) to anchor to structural slab below. Embed dowels into slab a minimum of 3-inches.
 - 3. Provide rubbed finish for all surfaces.
 - 4. Provide 3/4-inch chamfer at all exposed edges.
 - 5. Provide Engineer approved repairs if pad surface is rough or shows signs of honeycomb.
 - 6. Provide crown for exterior pads with a slope of 1/8-inch per foot.
 - 7. Do not set heavy equipment on pad for at least 7 days after pour unless approved by Engineer.
- D. Anchor equipment to concrete base.
 - 1. Locate anchors to be a minimum of 10 bolt diameters from edge of the base.

COMMON WORK RESULTS FOR ELECTRICAL SYSTEMS 26 05 00 - 10

2. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
3. Install anchor bolts to elevations required for proper attachment to supported equipment.
4. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.8 SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

- A. Comply with NECA 1.
- B. Coordinate all required openings and provide sleeves and inserts prior to construction of wall and floor systems. Where openings are missed or incorrectly located, provide core-drilling and patching at no additional expense to owner.
- C. Install sleeves without compromising structural integrity of wall or floor.
- D. Sleeves for Conduits or Cable Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:
 1. Interior Penetrations of Non-Fire-Rated Walls and Floors:
 - a. Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint.
 - b. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.
 2. Unless sleeve seal systems are used, size pipe sleeves to provide a minimum 1/4-inch annular clear space between sleeve and raceway. Where conduit motion due to expansion and contraction will occur, provide sleeves a minimum of two conduit sizes larger than the nominal conduit diameter.
 3. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls.
 - a. For conduit penetrations, cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
 - b. For cable penetrations, extend sleeve a minimum of 2-inches beyond surface of wall and provide plastic insulated bushing.
 4. Install sleeves for floor penetrations. Extend sleeves installed in floors a minimum of 6-inches above finished floor level unless noted otherwise. Install sleeves during erection of floors.
 5. Fasten sleeves securely in floors, walls, so that they will not become displaced when concrete is poured or when other construction occurs around them. Take precautions to prevent concrete, plaster or other materials being forced into the space between pipe and sleeve during construction.
- E. Sleeves for Cables Penetrating Non-Fire-Rated Gypsum Board Assemblies:
 1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.

COMMON WORK RESULTS FOR ELECTRICAL SYSTEMS 26 05 00 - 11

2. Seal space outside of sleeves with approved joint compound or acoustical sealant for gypsum board assemblies.
- F. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units and counter flashing applied in coordination with roofing work. Coordinate all work with roofing system to maintain roof warranty.
 - G. Exterior-Wall and Floor Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seal system. Size sleeves to allow for manufacturer recommended annular clear space between raceway or cable and sleeve for installing sleeve-seal system. Where sleeves are installed in core drilled openings, grout sleeve into the opening.
 - H. Where sleeves are installed exposed in finished spaces, provide metal escutcheon plates of size to match the sleeve.
 - I. Sleeve-Seal-System:
 1. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at raceway entries into building.
 2. Install type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.9 ELECTRICAL SYSTEM FIRESTOPPING INSTALLATION

- A. Install firestopping at all penetrations of fire-rated assemblies.
- B. Coordinate location and proper selection of firestop devices with fire rated assembly. Ensure cast-in place devices are installed before placement of concrete.
- C. Install firestop materials in accordance with UL Fire Resistance Directory and manufacturer's instructions.
- D. Affix permanent label to each side of penetration immediately adjacent to firestopping to communicate to futures installers and code authorities the following:
 1. Fire-stop product/system used
 2. Installation Company
 3. Penetration Hour Rating
 4. Installation Date
- E. Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas. Keep areas of work accessible until inspection by applicable code authorities.

COMMON WORK RESULTS FOR ELECTRICAL SYSTEMS 26 05 00 - 12

3.10 PAINTING

- A. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION

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SECTION 26 05 19

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General, Special and Supplementary Conditions, Division 01 Specification Sections, and Section 260010 "General Requirements for Electrical Systems" apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Building wire and cable rated 600 V and less.
 - 2. Connectors, splices, and terminations rated 600 V and less.
 - 3. Control Voltage Conductors and Cables

1.3 REFERENCES

- A. Abbreviations
 - 1. RoHS: Restriction of Hazardous Substances.
- B. Definitions
 - 1. Low Voltage: Circuits and equipment operating at more than 50VAC but less than 1000VAC for building electrical distribution systems.
 - 2. Control Voltage: Circuits and equipment operating at less than 50VAC for remote-control and signaling power-limited circuits.
 - 3. Plenum: A space forming part of the air distribution system to which one or more air ducts are connected. An air duct is a passageway, other than a plenum, for transporting air to or from heating, ventilating, or air-conditioning equipment.
 - 4. Homerun: The run of raceway(s) and cable(s) between the panelboard or switchboard and the junction box in the area served where branch circuit cables originate.
- C. Reference Standards: The following publications are referred to in the text by the basic designation only. The edition/revision of the referenced publications shall be the latest version as of the date of the Contract Documents, unless otherwise specified.
 - 1. National Electrical Contractors Association (NECA)
 - a. NECA 104, "Installing Aluminum Building Wire and Cable"
 - b. NECA/NACMA 120, "Standard for Installing Armored Cable (Type AC) and Type Metal-Clad (MC) Cable"

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product Schedule: Indicate type, use, and location.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

2.2 BUILDING WIRE AND CABLE

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Alpha Wire Company.
 - 2. Cerro Wire LLC.
 - 3. Encore Wire Corporation.
 - 4. General Cable Technologies Corporation.
 - 5. Okonite Company.
 - 6. Southwire Company.
- B. Building Wire Description: Flexible, insulated and uninsulated, drawn current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.
- C. Cable Description: A factory assembly of one or more current-carrying insulated conductors in an overall protective sheath.
- D. General Requirements:
 - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
 - 2. RoHS compliant.
 - 3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
- E. Copper Conductors: 98% conductive annealed copper, complying with ASTM B 3 for bare annealed copper and with ASTM B 8 for stranded conductors.
- F. Aluminum Conductors: AA8000 Aluminum Alloy, complying with ASTM B 800 and ASTM B 801.

G. Conductor Insulation:

1. 600V, 90°C
2. Comply with ANSI/NEMA WC 70/ICEA S-95-658.
3. THHN/THWN-2: Comply with UL 83.
4. XHHW-2: Comply with UL 44.
5. RHW-2: Comply with UL 44 and UL 2196.

H. Metal Clad Cable, Type MC

1. Comply with UL1569.
2. Circuits: Single circuit with color coded current carrying conductors and insulated ground conductor.
3. Conductor Insulation: THHN/THWN-2.
4. Armor Jacket: Aluminum or Steel Interlocking.
5. Listed for use in through penetration firestop systems.
6. Where applicable, integral 16AWG solid TFN (purple/grey) control conductors suitable for 0-10V dimming.
7. Type HCF: rated for healthcare use with grounded green exterior sheath.

2.3 SPLICING DEVICES & CONNECTORS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. 3M; Electrical Products Division.
2. AFC Cable Systems, Inc.
3. Burndy
4. Gardner Bender.
5. Hubbell Power Systems, Inc.
6. Ideal Industries, Inc.
7. ILSCO.
8. NSi Industries LLC.
9. O-Z/Gedney;
10. Thomas & Betts.
11. Tyco Electronics Corp.

B. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

C. Twist-On Wire Connectors: spring pressure type, 600V, 105°C insulation, suitable for connecting two or more wires in a pigtail application.

D. Crimp Sleeve Splices: butt or parallel crimp type, copper sleeve with nylon cover and skirted insulators, capable of permanent connection of two or more wires up to #10 AWG.

E. Compression Splices: standard or long barrel type, 90°C, with cold shrink tubing, for use with hydraulic crimping tool, capable of permanent connection of wires #6 AWG and larger.

- F. Ring or Flanged Fork Tongue Terminals: crimp type, 600V, 105°C insulation, insulated serrated barrel, capable of terminating wires up to #10 AWG.
- G. No aluminum splicing devices or connectors are permitted.

2.4 CONTROL VOLTAGE CONDUCTORS AND CABLE

- A. Control Cable: NFPA 70, Type CMG or CMP
 - 1. Single or Multi-pair, twisted, minimum No. 18 AWG, stranded tinned copper conductors.
 - 2. PVC insulation.
 - 3. Shielded or Unshielded.
 - 4. Flame Resistance:
 - a. CMG: Comply with UL1685
 - b. CMP: Comply with NFPA 262
- B. Class 1, 2, and 3 Control Circuits: Stranded Copper, Type THHN/THWN-2

PART 3 - EXECUTION

3.1 CONDUCTOR AND INSULATION APPLICATION

- A. Feeders and Branch Circuits: Copper. THHN/THWN-2. Solid for #10 AWG and smaller; stranded for # 8 AWG and larger.
 - 1. Provide XHHW-2 insulation for the following:
 - a. Circuits routed exposed on rooftops.
 - b. Conductors on the load side of a Variable Frequency Drive.
- B. Conductors for motors or vibrating or oscillating equipment: Extra flexible stranded.
- C. Cord Drops and Portable Appliance Connections: Type SOOW, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.
- D. Conductor sizes indicated on drawings are based upon 75 degree C rating.
- E. Minimum branch circuit or feeder size:
 - 1. Not less than #12 AWG copper wire unless noted otherwise.
- F. Minimum control circuit conductor sizes:
 - 1. Class 1 remote-control and signal circuits; No 14 AWG.
 - 2. Class 2 low-energy, remote-control, and signal circuits; No. 16 AWG.
 - 3. Class 3 low-energy, remote-control, alarm, and signal circuits; No 12 AWG
- G. Provide all wire for the project in new and undamaged condition. Deliver in standard coils or reels. Wires and cables manufactured more than 24 months prior to date of delivery to the site are not acceptable.

3.2 EXAMINATION

A. Prior to installing conductors and cables:

1. Verify that raceway installation is complete according to Section 260533 “Raceways and Boxes for Electrical Systems” and ready for installation of conductors and cables.
2. Verify that raceways are properly sized in accordance with NEC.
3. Visually inspect exposed raceways to ensure that raceways are not damaged and bends are not deformed.
4. Verify that raceways do not exceed the maximum number of bends between pull-points.
5. Verify raceways have been cleaned of all dirt and debris.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Pulling Conductors in Raceways

1. Pull cables in accordance with cable manufacturer and pulling equipment manufacturer recommendations as well as applicable sections of the National Electric Code.
2. Use installation equipment, tools, and materials as necessary, such as sheaves, pulling eyes, basket grips, winches, cable reels and/or cable reel jacks, duct entrance funnels, and pulling tension gauges, and approved pulling lubricants where required to facilitate cable pulling without damage to cables or raceway.
3. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not use lubricants that harden or become adhesive with age. Apply lubricant where cables enter ducts and conduits and at all intermediate access points on long or difficult pulls.
4. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values. Utilize special remote readout equipment to ensure compliance.
5. Avoid abrasion and other damage to cables during installation. Provide physical protection of cables, such as using appropriately sized flexible cable guides or feed-in tubes, at the entrance of boxes and raceways.
6. If basket-grip type cable-pulling devices are used to pull cable in place, cut off the section of cable under the grip before splicing and terminating.

B. Bend Radius

1. Handle conductors and cables carefully. Make bends in cables and conductors such that cables, conductors, sheaths, armor, etc., are not damaged.
2. Do not bend conductors and cables to less than the NEC and manufacturer recommended minimum bending radius.
3. Ensure that tools and accessories used to install conductors and cables, such as rollers, sheaves, trolley assemblies, tube guides, and/or raceways, are properly sized and utilized to be greater than the minimum bending radii of conductors and cables.
4. Minimize bending where conductors and cables enter or exit raceways, cabinets, and boxes. Do not install cables that have been bent or kinked to a radius less than the recommended dimension.
5. Install conductors only after insulating bushings are in place.

C. If multiple circuits are pulled in a single homerun, provide a dedicated neutral for each phase conductor. In these cases, a maximum of seven conductors (six current carrying and one ground) are permitted in a single conduit except for switch legs and travelers in multi-point switching arrangements. De-rate conductors per NEC.

- D. Multi-wire branch circuits with a shared neutral are not permitted unless specifically noted on the drawings. Where indicated, group the phases and neutral together with cable ties in the panelboard and in all pull boxes.
- E. Install conductors for isolated power systems in as short a run of conduit as practicable. The use of pulling compound or lubricant is not permitted on conductors in isolated power systems.
- F. Voltage Drop:
 - 1. Adjust conductors and conduit sizes accordingly based on actual field installed conditions.
 - 2. Size and Install all feeders and branch circuits for a maximum 2% voltage drop in feeders and 3% in branch circuits with a maximum total voltage drop of 5%.
 - 3. Calculate using a load equal to 80% of the supply breaker rating unless the circuit breaker is rated to carry 100% of the load.
 - 4. Where the conductor length from the panel to the first outlet on a circuit exceeds the values below, adjust branch circuit conductors from the panel to the first outlet. Increase the conductor size of remaining branch circuit as needed to meet above voltage drop limitations.
 - a. For 277VAC homeruns exceeding 125-feet, #10 AWG minimum
 - b. For 120VAC homeruns exceeding 50-feet, #10 AWG minimum
 - c. For 120VAC homeruns exceeding 100-feet, #8 AWG minimum
- G. Aluminum Conductors
 - 1. Aluminum Conductors are permitted for the following applications unless noted otherwise on drawings:
 - a. Service conductors
 - b. Aboveground normal power feeders to electrical equipment for applications 200 amps and above.
 - 2. Provide terminations according to NECA 104 and manufacturer's instructions using connectors listed for aluminum conductors and listed oxide inhibiting joint compound.
- H. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
- I. Install cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours.
- J. Bundle cables where run in groups using listed supports. Provide independent supports directly from structure, do not route through structure or on work of other trades.
- K. Metal Clad Cable, Type MC
 - 1. The use of metal clad cable is not permitted, except for connections to ceiling mounted recessed and semi-recessed luminaires concealed in accessible ceiling where the maximum length is limited to 72-inches.
 - 2. MC cable is permitted for the following applications:
 - a. Normal power branch circuits between wiring devices and nearest junction box, #10 and smaller, where concealed in walls and ceilings.
 - 1) Provide no more than three MC cable circuit connections per junction box.
 - 2) For power circuits, limit length of MC cable to 12ft from the junction box to the first wiring device and transition circuit to conduit if it continues outside the wall.

- 3) For lighting circuits, limit length of MC cable to 6ft from the junction box to the first luminaire and extend MC cable to other fixtures in the same room.
3. MC cable is not permitted for the following:
 - a. Emergency or standby power circuits
 - b. Feeders
 - c. Homeruns to panelboards.
 - d. Branch circuits with conductors larger than #10 AWG.
 - e. Branch circuits serving HVAC, and kitchen equipment loads.
 - f. Within mechanical, electrical or telecommunication equipment rooms.
 - g. Exposed locations.
 - h. Inaccessible ceiling locations.
 - i. Within masonry walls.
 - j. Exterior or outdoor locations.
 - k. Wet or damp locations.
 - l. Direct buried locations.
4. Where MC cable is permitted, comply with the following:
 - a. Install MC cables and connectors in accordance with NECA/NACMA 120.
 - b. Use only for single-circuit applications. For devices in the same wall connected to different circuits, install separate single circuit cable for each circuit.
 - c. Support MC cables with clamps, clips, or similar product specifically designed for supporting cables in accordance with NEC and route all runs parallel or perpendicular to building lines with right angle turns complying with manufacturer's bend radius requirements.
 - d. Cables shall be bundled where run in groups using listed supports to maintain proper spacing. Where spacing can't be maintained, apply adjustment factors for derating conductors.
 - e. Do not route through structure or on work of other trades. Provide independent supports directly from structure.
 - f. All MC cable which serves patient care areas shall be type HCF, rated for healthcare use with insulated ground wire and grounded sheath.

L. Control Circuit Conductors and Cables

1. Use insulated spade lugs for wire and cable connection to screw terminals.
2. Conductors installed within environmental air plenums shall be per NEC. Article 800 and other applicable codes, with FEP-type insulation or an approved equivalent. Provide plenum-rated cable supports where plastic straps or other supports, etc., are installed in plenum areas.
3. Where indicated, systems and control conductors that are installed exposed shall not be routed across ceilings or ductwork. Provide independent supports anchored to building structure or other permanent support members.
4. Install in such a manner as to not interfere with the access to or operation of equipment or removal of ceiling tiles.
5. Nylon tie-wraps shall be installed in such a manner so as to bundle conductors neatly, allowing runouts of single conductors or groups to drop down to equipment served.
6. Install grommets where dropping out of trays or into panels or service columns.
7. Install sleeves with bushings where penetrating partitions.
8. Provide firestopping for penetrations of fire rated assemblies with approved materials.

3.4 SPLICES, TAPS, CONNECTIONS, AND TERMINATIONS

- A. Prepare cable in accordance with the conductor, cable, splice and termination component manufacturers' recommendations and instructions.
- B. Cut conductors and cables using tools and methods which ensure a square cut. Do not nick or damage conductors.
- C. Ensure conductor inserts fully into the connector or termination with the insulation fitting closely to the connector or termination.
- D. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B. Where a tightening torque is indicated as a numeric value on equipment or in installation instructions provided by the manufacturer, a calibrated torque tools shall be used to achieve that indicated torque value, unless the equipment manufacturer has provided installation instructions for an alternative method of achieving the required torque.
- E. Splices and Taps
 - 1. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than un-spliced conductors.
 - 2. Make splices and taps in junction boxes or other enclosure approved for the wiring method.
 - 3. For conductors #10 AWG and smaller conductors, use pressure crimp type connections.
 - 4. For conductors #8 AWG and larger, use a hydraulic compression type connection, with cold shrink tubing and tape to restore full insulation value of the wire being spliced.
- F. Connections and Terminations
 - 1. Ensure that conductor temperature and ampacity ratings are compatible with connectors, terminals, and equipment to which they are to be connected.
 - 2. Provide crimp-applied ring or flanged fork type terminals for motor and equipment terminals where such terminals are provided on motor and equipment leads or on all stranded wire terminations using #10 AWG or smaller conductors.
 - 3. Motor Connections shall use connection lugs with motor stub splice insulators.
- G. Wiring at Outlets: Install conductors at each outlet with at least 12 inches of slack.
- H. All cables and wiring, regardless of voltage, installed in manholes or cable vaults shall be routed in such a manner to provide a minimum of 10 feet of slack cable for future splicing. Install cables along walls by utilizing the longer route from entry to exit. If both routes are symmetrical, provide a loop of cable secured to wall. All cables shall be tied to insulated cable supports on wall-mounted racks, spaced a maximum of three feet apart.

3.5 PROTECTION

- A. Intentional or unintentional painting of exposed low-voltage and/or control-voltage cabling insulation is prohibited. Ensure that exposed cabling is adequately protected from direct painting or overspray whether painting is required within the electrical specifications or required by other disciplines/trades.

- B. Review the project's painting requirements for all disciplines and provide protection as required.
- C. Where exposed cabling is being installed in exposed ceiling or wall spaces that are required to be painted, provide cabling in enclosed raceways or provide alternate options for cable colors to engineer for approval.

3.6 IDENTIFICATION

- A. Comply with Section 260553 "Identification for Electrical Systems."
 - 1. Identify all conductors by means of labels placed on conductors in all junction boxes and at each terminal point with labels indicating source, circuit number or terminal number.
 - 2. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.
 - 3. Identify each control voltage conductor or cable on each end and at each terminal with a number-coded identification tag. Each wire must have a unique tag.
- B. Provide conductors, in all sizes of cable, with continuous solid insulation color(s) from the manufacturer. Taped ends shall not be acceptable.
 - 1. Conductors shall be color coded as follows:
 - a. 120/208 Volt Conductors
 - 1) Phase A: Black
 - 2) Phase B: Red
 - 3) Phase C: Blue
 - 4) Neutral: White
 - 5) Ground: Green
 - 6) Isolated Ground: Green/Yellow
 - b. 277/480 Volt Conductors
 - 1) Phase A: Brown
 - 2) Phase B: Orange
 - 3) Phase C: Yellow
 - 4) Neutral: Gray or White with Brown tracer
 - 5) Ground: Green
 - 6) Isolated Ground: Green/Yellow
 - c. Isolated Power Conductors (Type XLP or XHHN-2)
 - 1) Phase A - Brown
 - 2) Phase B - Orange
 - 3) Phase C - Yellow
 - 4) Neutral - White with brown tracer stripe
 - 5) Note: Provide each phase with tracer color other than white, green, or gray.
 - d. Note: Further identify isolated power conductors with 1/2" wide purple tape at all terminations and junctions.
 - 2. Control voltage wiring color coding shall be consistent throughout the project and shall match existing equipment and standards where applicable. Color coding for each system shall be unique.
 - 3. Conductors within enclosures that may be energized when enclosure disconnect is off - yellow, or taped with 1/2" yellow tape every 6" of length, inside enclosure. Provide lamaroid plate warning sign on front of enclosure where this condition occurs.

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- 4. DC Wiring:
 - a. Positive: Light Blue
 - b. Negative: Dark Blue

3.7 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
- B. Visual Inspections:
 - 1. Compare cable data with drawings and specifications.
 - 2. Inspect exposed sections of cable for physical damage and correct connections in accordance with drawings.
 - 3. Inspect bolted electrical connections for high resistance. Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data.
 - 4. Inspect compression-applied connectors for correct cable match and indentation.
 - 5. Inspect for correct identification and arrangements.
 - 6. Inspect cable jacket insulation and condition.
- C. Electrical Tests:
 - 1. Perform insulation resistance testing for all electrical distribution system feeders unless notes otherwise. Testing may be witnessed by the Engineer and/or Commissioning agent. Schedule all tests with Architect with sufficient notice.
 - 2. Insulation resistance tests shall be performed at a DC voltage of 1,000 volts for 600 volt rated equipment, and at a DC voltage of 500 volts for 120-300 volt rated equipment. Test duration shall be one minute. Minimum acceptable (temperature corrected) resistance is 25 megaohms for 120-300 volt rated equipment and 100 megaohms for 600 volt rated equipment and wiring.
 - 3. Test instruments shall be calibrated to national standards within the last 12 months.
- D. Test and Inspection Reports: Prepare a written report to record the following:
 - 1. Test procedures used.
 - 2. Results that comply with requirements.
 - 3. Results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
- E. Cables will be considered defective if they do not pass tests and inspections. Remove and replace malfunctioning units and retest as specified above.
- F. Submit test results to Architect and Engineer for approval

END OF SECTION

SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General, Special and Supplementary Conditions, Division 01 Specification Sections, and Section 260010 “General Requirements for Electrical Systems” apply to this Section.

1.2 SUMMARY

- A. Description: Grounding and Bonding for electrical systems covers several different but interrelated systems including Electrical System Grounding, Equipment Grounding System, Grounding Electrode System, and interfaces with telecommunications bonding infrastructure as well as lighting protection systems.
- B. Section includes requirements for electrical system and equipment grounding, plus the following special applications:
 - 1. Underground distribution grounding.
 - 2. Grounding electrodes.
 - 3. Ground bonding common with lightning protection system.

1.3 REFERENCES

- A. Abbreviations
 - 1. MGB: Main Grounding Busbar
- B. Definitions
 - 1. Grounding: Establishing a direct or indirect connection to Earth or some conducting body that serves in place of Earth.
 - 2. Bonding: Method by which all non-energized conductive materials are effectively interconnected to create a low impedance path.
- C. Reference Standards: The following publications are referred to in the text by the basic designation only. The edition/revision of the referenced publications shall be the latest version as of the date of the Contract Documents, unless otherwise specified.
 - 1. National Electrical Contractors Association (NECA)
 - a. NECA 331 – Standard for Building and Service Entrance Grounding and Bonding

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Coordination Drawings: Plans showing dimensioned locations of grounding electrodes, test wells, and other grounding features.
- C. Field quality-control reports. Provide test reports for each test specified in the field quality control section. Include copies of current equipment calibration certification.
- D. Closeout Submittal:
 - 1. Operation and Maintenance Data: For grounding to include in emergency, operation, and maintenance manuals.
 - 2. In addition to items specified in Division 01 and Section 260010 "General Requirements for Electrical Systems", include the following:
 - a. Instructions for periodic testing and inspection of grounding systems and features based on NETA MTS and NFPA 70B.
 - 1) Tests shall determine if ground-resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if values do not.
 - 2) Include recommended testing intervals.
 - 3. As-Built Data: Plans showing dimensioned as-built locations of grounding features specified in "Field Quality Control" Article, including the following:
 - a. Test wells.
 - b. Grounding electrodes and connections.
 - c. Grounding arrangements and connections for separately derived systems.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
- B. Comply with NFPA 70 and UL 467 for grounding and bonding materials and equipment.

2.2 MANUFACTURERS:

- A. Subject to compliance with requirements, provide products by one of the following:
 - 1. ABB Blackburn
 - 2. Eaton B-Line
 - 3. Harger
 - 4. Hubbell Burndy
 - 5. IlSCO
 - 6. nVent Erico

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7. Panduit
8. VFC Lyncole

2.3 CONDUCTORS

- A. Insulated Copper Conductors: Comply with Section 260519 “Low-Voltage Electrical Power Conductors and Cables”.
- B. Bare Copper Conductors:
 1. Solid Conductors: ASTM B 3.
 2. Stranded Conductors: ASTM B 8.
 3. Tinned Conductors: ASTM B 33.
- C. Straps/Jumpers: Copper tape, braided conductors pre-terminated with copper ferrules, cross-sectional area no less than a No. 6 AWG conductor.

2.4 ELECTRICAL SYSTEM BUSBARS

- A. Grounding Busbar: Predrilled rectangular bars of annealed copper, minimum 1/4 by 4 inches in cross section, with 9/32-inch holes spaced 1-1/8 inches apart. Size busbar length to accommodate initial conductor installation plus a 50% growth factor. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 1000 V and shall be Lexan or PVC, impulse tested at 5000 V.

2.5 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Welded Connectors: Exothermic-welding kits consisting of graphite molds, copper oxide and aluminum weld metal, and electronic ignition system. Provide types recommended by kit manufacturer for materials being joined and installation conditions.
- C. Irreversible Compression Connectors: Tin-plated copper, for installation using a hydraulic compression tool and die matched to connector type. Provide with die code or other visual indicator to ensure proper connector selection and uniform compression for a permanent connection.
 1. Taps: C-type, H-type, or Figure 6/8 type.
 2. Splices: Long Barrel straight or tee.
 3. Terminals: Two-hole lug long barrel type.
- D. Mechanical Connectors: Tin-plated high strength copper alloy or high strength cast bronze
 1. Water Service Pipe Clamps: Heavy-Duty, two-piece saddle type with stainless steel bolts.
 2. Pipe Clamps: Heavy-Duty, U-bolt type with silicon bronze hardware.
 3. Lay-in Lug Connector: Heavy-Duty, open face lug with hex head set screw.

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2.6 GROUNDING ELECTRODES

- A. Ground Rods: 10 mil pure electrolytic copper coating with molecular bond to high strength steel core; 3/4 inch by 10 feet with chamfered end. Ensure ground rods are die-stamped near the top with the name and trademark of the manufacturer and the length in feet.
- B. Enhanced Composite Backfill: Electrically conductive, environmentally-safe, maintenance free backfill material with neutral PH properties that creates a stable, non-corrosive, low resistance connection between a grounding electrode and earth. Basis of Design: Erico Ground Enhancement Material (GEM).
- C. Test Well: Lightweight polymer concrete, Tier 15 rated, non-slip cover, suitable for non-deliberate incidental traffic. 12-inch by 12-inch minimum, 12-inches deep unless noted otherwise, with "GROUND" legend unless noted otherwise.

PART 3 - EXECUTION

3.1 GENERAL

- A. Bond grounding bus and all non-current carrying metallic parts of raceways systems and equipment to common ground in accordance with the National Electrical Code, NECA 331, as shown on the Contract Drawings, and in accordance with the requirements of the local authority having jurisdiction.
- B. The size of the grounding and bonding conductors shall be not less than that given in Article No. 250 of the National Electrical Code, and/or as shown on the Contract Drawings.
- C. Interconnect all grounding systems in or on the structure to provide a common ground potential.
- D. Bond all outlet, junction, pull boxes, and enclosures to the equipment grounding conductor with a grounding pigtail.

3.2 APPLICATIONS

- A. Conductors: Install solid conductor for #10 AWG and smaller, and stranded conductors for #8 AWG and larger unless otherwise indicated.
 - 1. Install bare conductors where not specifically identified as bare or insulated except where installed in conduit with associated phase conductors. Install insulated conductors in conduit with insulation of the same material as the associated phase conductors with which it is installed.
 - 2. Provide insulated conductors not exceeding No. 8 AWG in size with green colored insulation. Identify conductors larger than No. 6 AWG with 4-inch green tape at each termination and at all junction and pull boxes.
- B. Underground Grounding Electrode Conductors: Install bare copper conductor, sized per NEC or as indicated on drawings, whichever is larger.
 - 1. Bury at least 24 inches below grade or below the frost line depth, whichever is greater.

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2. Duct-Bank Grounding Conductor: Bury 12 inches above duct bank when indicated as part of duct-bank installation.
- C. Electrical System Grounding Busbar: Install in electrical rooms housing service equipment, and elsewhere as indicated to provide a common connection point for individual grounding electrode conductors and bonding jumpers.
1. Install bus horizontally, on insulated spacers 4 inches minimum from wall, 18 inches above finished floor unless otherwise indicated.
 2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, and down; connect to horizontal bus.
 3. Provide green laminated plastic nameplate with 1/2" high white letters indicating function of ground bus (i.e. "Service Main Ground Busbar").
- D. Conductor Terminations and Connections:
1. Pipe and Equipment Grounding Conductor Connections: Mechanical connectors.
 2. Underground and Exposed Exterior Connections: Exothermic welded connectors except at test wells and as otherwise indicated.
 3. Connections to Ground Rods at Test Wells: Mechanical connectors.
 4. Connections to Structural Steel: Exothermic welded connectors.
 5. Connections to Busbars: Irreversible compression connectors.

3.3 GROUNDING AT THE SERVICE

- A. Equipment grounding conductors and grounding electrode conductors shall be connected to the neutral bus except where service equipment neutral and ground bussing complies with exceptions listed in the NEC. Install a main bonding jumper between the neutral bus and ground bus. Provide external grounding busbar and install grounding electrode conductor to interconnect main grounding busbar and neutral bus.
- B. Where ground fault protection is installed, ensure interconnection of neutral bus and ground bus does not interfere with correct operation of fault protection.

3.4 GROUNDING SEPARATELY DERIVED SYSTEMS

- A. Transformers: Provide grounding in accordance with the NEC and the following:
1. System Bonding Jumper (SBJ): Install at the source enclosure between the grounded terminal (neutral) and the equipment grounding terminal.
 2. Supply Side Bonding Jumper (SSBJ): Install wire type SSBJ to bond the source enclosure to the enclosure at the first disconnect or overcurrent protective device.
 3. Grounding Electrode Conductor (GEC): Install at the source enclosure from the SBJ connection point to the building grounding electrode system.
 4. Bonding Jumpers: Where the metal water piping and/or the metal structural steel building frame in the area served by the separately derived system are not used as a grounding electrode, provide bonding jumper to the GEC connection point at the source enclosure.
 5. Equipment Grounding Conductor (EGC): Bond the EGC of the primary feeder to the equipment grounding terminal.

3.5 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

- A. Comply with IEEE C2 grounding requirements for utility equipment.
- B. Exterior Pad-Mounted Equipment: Install a minimum of two ground rods and ground ring around the pad. Ground pad-mounted equipment and noncurrent-carrying metal items associated with equipment by connecting them to underground grounding conductors and grounding electrodes. Install tinned-copper conductor not less than No. 2 AWG for ground ring and for taps to equipment grounding terminals. Bury ground ring not less than 6 inches from the foundation.

3.6 EQUIPMENT GROUNDING AND BONDING

- A. Equipment Grounding Conductors: Install insulated equipment grounding conductors with all feeders and branch circuits. Provide conductors of the same wire/cable type as the ungrounded current carrying conductors.
- B. Increase equipment grounding conductor sizes in accordance with NEC article 250 where ungrounded current carrying conductor sizes are increased to minimize voltage drop.
- C. Provide all circuits with a dedicated equipment grounding conductor unless noted otherwise.
- D. Provide an equipment grounding conductor to each outlet on circuits protected by a GFCI circuit breaker.
- E. At all metallic outlet, junction and pull boxes, bond the equipment grounding conductor to the enclosure.
- F. Metal Poles Supporting Outdoor Lighting Fixtures: Install a ground rod and a separate insulated equipment grounding conductor at each pole in addition to grounding conductor installed with branch-circuit conductors.

3.7 INSTALLATION

- A. Grounding Electrode Conductors and Bonding Jumpers: Securely fasten and route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
 - 1. Route conductors to maintain a downward or horizontal direction to ground with a minimum bend radius of 8-inches.
 - 2. Protection: Install above grade conductors No 6 AWG or larger exposed to physical damage and all conductors smaller than No. 6 AWG in schedule 80 PVC conduit. Where metallic conduit is required, bond each conduit end to the electrode or ground conductor as close to the openings as possible with a full-size conductor and bonding bushing to create an electrically parallel path.
 - 3. Clearance: Maintain a minimum separation of 12-inches from open telecommunications cable groups.

- B. Ground Rods: Auger 6 inch diameter hole to depth 6 inches shorter than the ground rod length. Drive rods a minimum of 12 inches into the bottom of the hole until tops are 12 inches below final grade. After installing connections, backfill around ground rod with enhanced composite backfill.
1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
 2. Except at test wells, use exothermic welds for all below-grade connections to ground rods.
 3. For grounding electrode system at the service, install at least three rods spaced at least two-rod lengths from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.
- C. Test Wells: Ground rod driven through drilled hole in bottom of handhole.
1. Install at least one test well for each service unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.
- D. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts. Install straps and jumpers such that it does not restrict movement of the structure to which it is connected.
 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
 3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.
- E. Grounding and Bonding for Piping:
1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes using a mechanical connector. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
 2. Water Meter: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
 3. Other Metal Piping: Bond each aboveground portion of metal piping systems, including gas piping, downstream from its equipment shutoff valve in an accessible location.
 4. Except for water piping, do not utilize piping systems as a ground path where dielectric fittings are utilized. Do not use bonding jumpers to bridge over such fittings.
 5. Do not use underground portions of natural gas, flammable gas, or liquid fuel piping as grounding electrodes.
- F. Grounding for Steel Building Structure:
1. Where the building's steel frame is made discontinuous by masonry breaks or expansion joints, provide an accessible No. 500 kcmil bare copper jumper with exothermic weld connections to bond steel sections together, making the steel frame electrically

- continuous. The installation of the bonding jumpers shall be reviewed by the Engineer before covering.
2. Provide a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet apart.
- G. Concrete-Encased Grounding Electrode (Ufer Ground): Provide and fabricate in accordance with NFPA 70; use a minimum of 20 feet bare copper conductor no smaller than #4 AWG located in building footing that has direct contact with earth.
1. If concrete foundation is less than 20 feet long, coil excess conductor within base of foundation.
 2. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts using exothermic weld connections. Extend grounding conductor below grade and connect to building's ground ring or to grounding electrode external to concrete.
- H. Exothermic Welded Connections: Provide in kit form and selected for the specific types, sizes, and combinations of conductors and other items to be connected.
1. An electronic ignition system shall be used and weld metal shall be a self-contained, sealed system with a bi-metallic fuse to start the reaction.
 2. Comply with AWS Standards and manufacturer's instructions for procedures, appearance, and quality of welds; and methods used in correcting welding work.
 3. Ensure process joins all strands and does not cause the parts to be damaged or weakened.
 4. Completed connection or joint must be equal or larger in size than the conductors joined and have the same current-carrying capacity as the largest conductor.
- I. Mechanical Connections: Install mechanical connections in accessible locations.
1. Tighten connectors and terminals, including screws and bolts, in accordance with manufacturer's published torque tightening values.
 2. Where manufacturer's torqueing requirements are not indicated, tighten connections to comply with tightening torque values specified in UL 486A to assure permanent and effective grounding.
- J. Connections between Dissimilar Metals: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.
1. Clean surfaces and apply anti-oxidant compound prior to installation of connections.
 2. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
 3. Make connections with clean, bare metal at points of contact.
 4. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
 5. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
 6. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

3.8 FIELD QUALITY CONTROL

- A. Buried or concealed grounding electrode systems shall be accepted by Engineer and Owner Representative before backfilling or covering.
- B. Tests and Inspections:
 - 1. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
 - 2. Bond Resistance Test: Test the bonding connections of the system using a certified micro-ohmmeter, taking two-point resistance measurements across each bond in the grounding electrode system. The maximum acceptable value of each bond is 0.5 milliohms.
 - 3. After completing installation of the grounding electrode system and finished grade, but before permanent electrical circuits have been energized, test for compliance with requirements.
 - 4. Grounding Electrode Resistance Test: Test completed grounding electrode system at service disconnect enclosure grounding terminal and at ground test wells using a manufacturer calibrated and certified 3-point ground resistance tester.
 - a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
 - b. Perform tests by three-point fall-of-potential method according to IEEE 81.
 - c. Disconnect and isolate the grounding electrode conductor from the electrical system at the main ground bus before testing.
 - d. Install outer test probe outside the sphere of influence of the grounding electrode system. This value is typically 10 times the size of the grounding electrode system, between 300 and 500 feet from the main ground bus.
 - e. Install inner test probe at 10 equally spaced intervals, in a straight line between the grounding electrode system connection and the outer test probe and note the resistance reading at each location.
 - f. The resistance measurements taken from the flat part of the curve shall be averaged to determine the grounding electrode system resistance to earth.
 - g. If large variations are noted in the resistance measurements, the outer test probe should be relocated further from grounding electrode system (outside its sphere of influence) to achieve some degree of flatness on the resistance curve.
 - h. Excessive Ground Resistance: If resistance to ground exceeds 5-ohms, notify Engineer promptly and include recommendations to reduce ground resistance. If deemed necessary by the Engineer, additional electrodes shall be placed and the measurement process repeated until the desired ground potential achieved.
 - 5. Prepare dimensioned Drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include test probe locations, observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
- C. Grounding system will be considered defective if it does not pass tests and inspections.

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- D. Prepare detailed test and inspection reports and submit to Engineer for review.

END OF SECTION

SECTION 26 05 33

RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General, Special and Supplementary Conditions, Division 01 Specification Sections, and Section 260010 – General Requirements for Electrical Systems apply to this Section.

1.2 SUMMARY

- A. This section is intended to specify the raceways, fittings, boxes, cabinets, specialties and related items necessary to complete the work as shown on the drawings and specified herein.
- B. Section Includes:
 - 1. Metal conduits and fittings
 - 2. Nonmetallic conduits and fittings
 - 3. Surface metal raceway
 - 4. Metal wireways and auxiliary gutters.
 - 5. Boxes, enclosures, and cabinets
 - 6. Wall ducts and trench ducts.

1.3 REFERENCES

- A. Abbreviations
 - 1. EMT: Electrical Metallic Tubing
 - 2. ERMC-S: Electrical Rigid Metal Conduit – Steel.
 - 3. FMC: Flexible Metal Conduit
 - 4. GRC: Galvanized Rigid Steel Conduit
 - 5. IMC: Intermediate Metal Conduit
 - 6. LFMC: Liquid-tight Flexible Metal Conduit.
 - 7. RAC: Rigid Aluminum Conduit
 - 8. RMC: Rigid Metal Conduit
- B. Definitions
 - 1. Outlet: A point on the wiring system at which current is taken to supply utilization equipment.
 - 2. Raceway: an enclosed channel designed for enclosing and protecting electrical, communications, and signaling wires and cables.

- C. Reference Standards: The following publications are referred to in the text by the basic designation only. The edition/revision of the referenced publications shall be the latest version as of the date of the Contract Documents, unless otherwise specified.
1. National Electrical Contractors Association (NECA)
 - a. NECA 101 - Standard for Installing Steel Conduits (RMC, IMC, EMT)
 - b. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC)
 2. National Electrical Manufacturers Association (NEMA)
 - a. NEMA FB 2.10 - Selection and Installation Guidelines for Fittings for Use with Non-Flexible Metallic Conduit or Tubing (Rigid Metal Conduit, Intermediate Metal Conduit, and Electrical Metallic Tubing)
 - b. NEMA FB 2.20 - Selection and Installation Guidelines for Fittings for Use with Flexible Electrical Conduit and Cable
 - c. NEMA RV 3 - Application and Installation Guidelines for Flexible and Liquid-tight Flexible Metal Conduits

1.4 SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop drawings: For custom enclosures, cabinets, or boxes.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

2.2 METAL CONDUIT AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 1. AFC Cable Systems, Inc.
 2. Allied Tube & Conduit.
 3. Anamet Electrical, Inc.
 4. Calconduit
 5. Electri-Flex Company.
 6. Nucor Tubular Products.
 7. O-Z/Gedney.
 8. Picoma Industries.
 9. Robroy Industries.
 10. Southwire Company.
 11. Thomas & Betts Corporation.

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12. Western Tube and Conduit Corporation.
 13. Wheatland Tube Company.
- B. Electrical Metallic Tubing (EMT) and Elbows:
1. Comply with ANSI C80.3 and UL 797.
- C. Electrical Rigid Metal Conduit (ERMC-S, GRC, RMC) and Elbows:
1. Comply with ANSI C80.1 and UL 6.
 2. Zinc coating both inside and outside by means of hot-dip galvanizing.
 3. Use only threaded fittings for ERMC-S.
- D. PVC Coated Galvanized Rigid Metal Conduit (RMC) and Elbows:
1. Comply with NEMA RN 1
 2. Minimum 40 mil thick PVC exterior coating with overlapping sleeves protecting threaded joints.
 3. Minimum 2 mil thick urethane interior coating.
 4. Clear urethane coating over hot-dip galvanized threads.
- E. Electrical Intermediate Metal Conduit (IMC) and Elbows:
1. Comply with ANSI C80.6 and UL 1242
- F. Flexible Metal Conduit (FMC):
1. Comply with UL 1.
 2. Continuous interlocked hot-dip zinc galvanized steel with smooth interior and exterior.
 3. Suitable for dry locations.
- G. Liquid-tight Flexible Metal Conduit (LFMC):
1. Comply with UL 360.
 2. Continuous interlocked hot-dip zinc galvanized steel core with smooth interior and exterior.
 3. Suitable for wet and dry locations, direct burial applications, and concrete encasement.
 4. Sunlight resistant, flame retardant thermoplastic PVC jacket resistant to heat, oil, and chemical breakdown.
- H. Metal Fittings
1. Comply with NEMA FB1 and UL 514B.
 2. Listed and labelled for type of conduit, location, and use.
 3. Fittings for EMT:
 - a. Compression type, zinc-plated galvanized steel.
 - b. Concrete-tight- or rain-tight, hardened steel locknuts, and nylon insulating throats.
 4. Fittings for ERMC-S and IMC:
 - a. Threaded zinc plated steel.
 - b. Concrete-tight- or rain-tight, nylon insulating throats.
 5. Conduit Bodies:
 - a. Material: gray iron or heavy copper-free cast aluminum
 - b. Available in varying configurations with integral bushing and gasketed coverplate.
 6. Expansion/Deflection Fittings: UL 651 listed, manufactured coupling accommodating 3/4-inch linear movement from normal and 30-degree angular movement in all directions

- a. Basis of Design: OZ/Gedney DX
 - b. PVC or steel sleeve to match conduit type with neoprene jacket, rated for environmental conditions where installed.
 - c. Integral braided copper bonding jumper.
- 7. Fittings for FMC and LFMC:
 - a. LFMC: Tubular Steel, zinc-plated with gland nut, sealing ring, high tensile grounding ferrule, insulated throat, and body for liquid tight connection.
- 8. Fittings for Hazardous (Classified) Locations: Comply with UL 1203 and NFPA 70.
- 9. "Kwik-Couple" type fittings are not permitted.
- 10. Indentation, set-screw, or die-cast fittings are not permitted.
- I. Joint Compound for threaded conduit: UL 2419 listed for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.3 NON-METALLIC CONDUITS AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Allied Tube & Conduit
 - 2. Cantex
 - 3. Carlon
 - 4. Heritage Plastics
 - 5. National Pipe & Plastics
 - 6. Prime Conduit
- B. Rigid Polyvinylchloride (PVC) Conduit:
 - 1. Comply with NEMA TC-2 and UL 651.
 - 2. Sunlight resistant and suitable for use with 90 degree C conductors.
 - 3. Type EPC-40 suitable for normal duty applications.
 - 4. Type EPC-80 suitable for heavy duty applications.
- C. Non-Metallic Fittings
 - 1. Comply with NEMA TC 3 and UL514B.
 - 2. Listed and labelled for type of conduit, location, and use.
 - 3. Compatible with conduit type and material.
 - 4. Solvents and Adhesives: as recommended by conduit manufacturer.

2.4 SURFACE MOUNTED METAL RACEWAY

- A. Manufacturers: Subject to compliance with requirements, provide products from one of the following:
 - 1. Hubbell
 - 2. Mono-Systems
 - 3. Wiremold

- B. Source Limitations: Obtain surface metal raceway, components, outlets, and fittings from single manufacturer.
- C. Single and Multi-Channel Raceways:
 - 1. Two-piece design with base and snap on cover complying with UL 5, suitable for use with electrical branch circuit wiring, data/voice network cabling, and low voltage wiring.
 - 2. Material: Galvanized Steel
 - 3. Finish: Manufacturer's standard enamel finish in color selected by Architect, suitable for field painting to match adjacent surfaces.
 - 4. Size: Available in varying widths, selected to accommodate number of conductors and services indicated on drawings with a maximum of 40-percent fill.
- D. For multi-channel configurations, provide integral divider separating raceway into equal compartments for power and low voltage wiring.
- E. Fittings: Include clips, straps, couplings, elbows, tees, connectors, and bushings suitable for interconnecting raceway segments in various configurations. Fittings to overlap raceway and hide uneven cuts. Material and finish to match raceway.
- F. Device Boxes: single and multi-gang configurations, suitable for mounting standard devices and faceplates. Material and finish to match raceway.
- G. Device Plates: sized to match raceway width with openings suitable for mounting various standard power and communications devices. Material and finish to match raceway.
- H. Device Brackets: suitable for mounting standard single or two-gang devices horizontally or vertically within large raceways.
- I. Plugmold: steel surface metal raceway with integral Simplex NEMA 5-20R outlets spaced 12-inches on center or as indicated on drawings.

2.5 METAL WIREWAYS AND AUXILIARY GUTTERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Eaton B-Line
 - 2. Hubbell Wiegmann.
 - 3. nVent Hoffman.
 - 4. Square D.
- B. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 1 unless otherwise required by environmental application, and sized according to NFPA 70. Minimum of 14-gauge steel before finishes are applied.
- C. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for a complete system.
 - 1. Provide knockouts on all runs, unless otherwise indicated or prohibited by codes.

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2. Provide dividers to separate conductors of different insulation levels or where required by equipment vendor installation instructions.
- D. Wireway Covers: Furnish with continuous hinged covers on all runs and removable covers on all fittings unless otherwise noted, to allow a continuous unobstructed path for conductor installation.
 - E. Finish: Manufacturer's standard enamel finish resistant to corrosion, moisture, and oil.
 - F. Size: available in nominal sizes 2-1/2-inch by 2-1/2-inch, 4-inch by 4-inch, 6-inch by 6-inch or 12-inch by 12-inch.
 - G. Install supports to allow unobstructed access to wireway interior. Use minimum 1/4-inch rod hangers for up to 4-inch by 4-inch wireway, 3/8-inch rod up to 8-inch by 8-inch wireway, and 1/2-inch rod for 12-inch by 12-inch wireway.

2.6 BOXES, ENCLOSURES, AND CABINETS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 1. Eaton Crouse-Hinds.
 2. Emerson/Appleton Electric.
 3. FSR Inc.
 4. Garvin Industries
 5. Hoffman.
 6. Hubbell Killark.
 7. Milbank Manufacturing Co.
 8. Mono-Systems, Inc.
 9. O-Z/Gedney.
 10. RACO / Hubbell.
 11. Stahlin Non-Metallic Enclosures.
 12. Thomas & Betts.
 13. Wiremold / Legrand.
- B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets shall be listed for intended use.
- C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy or aluminum, Type FD, with gasketed cover.
- E. Luminaire Outlet Boxes: Non-adjustable, designed for attachment of luminaires, listed and marked for the maximum allowable weight with at least a 2.0 safety factor for the anticipated fixture weight.
- F. Paddle Fan Outlet Boxes: Nonadjustable, designed for attachment of paddle fan weighing 70 lb.

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- G. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1, constructed of code gauge, galvanized steel with sides formed and corner seams riveted or welded before galvanizing
- H. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum with gasketed cover.
- I. For box extensions and mud rings used to accommodate building finishes, provide with same material as recessed box.
- J. Minimum Device Box Dimensions unless noted otherwise:
 - 1. Single gang: 4-inches square by 2-1/8-inches deep with single gang extension ring.
 - 2. Two gang: 4-inches square by 2-1/8-inches deep with two-gang extension ring.
 - 3. Three gang: 8-5/8-inches by 4-1/2-inches by 2-1/2-inches deep with three gang extension ring.
 - 4. Four gang: 10-7/16-inches by 4-1/2-inches by 2-1/2-inches deep with four gang extension ring.
- K. Gangable boxes are prohibited.
- L. Boxes assembled with sheet metal screws are prohibited.
- M. Hinged Cover Enclosures: Comply with UL 50 and NEMA 250, suitable for installed environment with continuous-hinge cover and flush latch unless noted otherwise.
 - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
 - 2. Nonmetallic Enclosures: Fiberglass
 - 3. Interior Panels: Steel, all sides finished with manufacturer's standard enamel.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Unless more stringent requirements are specified in Contract Documents or manufacturers' written instructions, comply with NFPA 70 for selection of raceways. Consult Architect for resolution of conflicting requirements.
- B. Apply raceway products as specified below unless otherwise indicated:
 - 1. Exterior and Exposed: ERM-C-S
 - 2. Concealed Underslab: ERM-C-S or PVC Type EPC-40 where approved.
 - 3. Concealed Underslab with conductors above 600V: Concrete encased ERM-C-S or concrete encased PVC Type EPC-40 where approved.
 - 4. Interior, Concealed in Ceilings, Walls, and Partitions: EMT, IMC, or ERM-C-S
 - 5. Interior, Concealed in Below Grade Concrete or Grouted Masonry Walls and Partitions: IMC or ERM-C-S
 - 6. Interior, Damp or Wet Locations: ERM-C-S.
 - 7. Interior, Where exposed and Not Subject to Physical Damage: EMT, ERM-C-S, or IMC. Raceway locations include the following:
 - a. Electrical Rooms

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8. Interior, Where Exposed and Subject to Severe Physical Damage: ERM-C-S. Raceway locations include the following:
 - a. Loading dock.
 - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
 - c. Mechanical rooms (below 8'-0").
 - d. Gymnasiums.
 9. Interior, where Exposed in washdown area and Subject to Severe Physical Damage: PVC Coated RMC. Raceway locations include the following:
 - a. Exposed stub-ups in Commercial Kitchen or Cafeteria.
 10. Interior, where Exposed and subject to Corrosive Environment: RNC Type EPC-80 PVC. Raceway locations include the following:
 - a. Pools and Natatoriums.
 11. Conductors operating above 600V: ERM-C-S.
 12. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFM-C.
 13. Connection to ceiling mounted recessed and semi-recessed luminaires and electrical devices: FM-C.
 14. Boxes and Enclosures: NEMA 250, Type 1 except as follows:
 - a. Damp or Wet locations: NEMA 250, Type 3R
 - b. Dishwash Rooms and Hose Down Areas in Commercial/Institutional Kitchens and Cafeterias: NEMA 250, Type 3R
 - c. Corrosive environments: NEMA 250, Type 4X
 15. Exposed Boxes subject to physical damage: Die cast metal boxes with threaded hubs.
 16. EMT is not permitted underslab, embedded in concrete slabs, or where exposed to physical damage.
 17. Non-metallic conduit is not permitted for the following applications unless approved by the Engineer:
 - a. Interior Locations including environmental air plenums.
 - b. Applications where a redundant ground fault path is required by code.
 18. Flexible non-metallic conduit is not permitted.
 19. Unless otherwise indicated on the drawings, intermediate metal conduit (IMC) may be used in any location in place of rigid metal conduit (ERM-C-S), where permitted by codes, and where approved by the Engineer.
- C. Minimum Raceway Size: 3/4-inch trade size unless noted otherwise on the drawings.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
 2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
 3. EMT: Use compression, steel fittings. Comply with NEMA FB 2.10.
 4. Flexible Conduit: Use only steel fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
- E. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth or where prolonged contact with construction materials will degrade the aluminum.

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- F. Install raceways and fittings in a manner to avoid use of dissimilar metals that would result in galvanic action corrosion.
- G. Install surface conduits or raceways only where indicated on Drawings.
- H. Do not install surface conduits or raceways on exterior facades unless approved by Engineer.
- I. Do not install nonmetallic conduit where ambient temperature or operating temperature of the conductors exceeds the rating of the raceway.
- J. Conduit installed embedded in concrete slabs is not permitted.

3.2 RACEWAY INSTALLATION

- A. Comply with requirements in Section 260500 "Common Work Results for Electrical Systems" for hangers and supports.
- B. Comply with NECA 1, NECA 101, NECA 111 and manufacturer's written instruction for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- C. Complete raceway installation before starting conductor installation.
- D. Comply with utility company requirements for raceways and boxes containing utility company conductors.
- E. Size raceways to conform with Annex C, of the National Electrical Code, unless otherwise shown on the Contract Drawings.
- F. Level and square raceway runs, and install at proper elevations and required heights. Hold tight to structure wherever possible, to maximize available space and not restrict other trades.
- G. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated.
- H. Install conduits with runs parallel or perpendicular to building lines, walls, structural members or intersections of vertical planes and ceilings, with right angle turns consisting of cast metal fittings or symmetrical bends unless otherwise shown. Randomly routed conduits are not acceptable.
- I. Make bends in raceway using large-radius preformed elbows. Provide concentric bends for parallel runs of conduit. Conform with NFPA 70 minimum radii requirements for field bending. Use only equipment specifically designed for material and size involved.
- J. Install no more than the equivalent of three 90-degree bends in any conduit run. Support within 12-inches of changes in direction.
- K. Provide junction boxes or pull boxes so that conduit runs do not exceed 100 feet, or as shown on the Contract Drawings. Size junction boxes per NEC, Article 370.
- L. Provide conduit supports spaced not more than 8-feet apart.

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- M. Support conduit within 12-inches of enclosures to which attached.
- N. Do not drill into bar joists to support raceways or cables.
- O. Install conduits at least 12-inches away from flues, steam or hot water pipes.
- P. Conduit installed under concrete slabs is permitted for feeders and for branch circuits serving floor outlets. Underslab conduit is prohibited for other locations unless noted on the drawings or with permission of the engineer. Where approved, comply with the following:
 - 1. Locate raceway a minimum of 12-inches below the bottom of slab.
 - 2. Provide minimum 2-inch spacing between conduits to ensure proper compaction of structural fill.
 - 3. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
 - 4. Transition underslab RNC to ERM-C-S for all bends larger than 20-degrees and for all stub-ups through a slab on grade. Arrange stub-ups so curved portions of bends are not visible above finished slab. Extend ERM-C-S stub-ups a minimum of 6" above the concrete slab. Schedule 80 PVC stub-ups are allowed where approved by engineer.
 - 5. Seal around conduits when penetrating vapor barriers.
 - 6. Where installed in corrosive soils, coat all underslab rigid steel conduit with two coats of bitumastic paint such as "Asphaltum".
- Q. Where raceways are subject to environmental changes, locate seals immediately at the boundary so no fittings or boxes are between the seal and the change of environments that would allow migration of condensation within the raceway system. Seal the interior of all raceways at the following points:
 - 1. Where conduits pass from cold to warm locations, such as boundaries of refrigerated spaces and at building wall and roof penetrations.
 - 2. Where an underground service raceway enters a building or structure.
 - 3. Conduit extending from interior to exterior of building.
 - 4. Conduit extending into pressurized duct and equipment.
 - 5. Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.
 - 6. Where otherwise required by NFPA 70.
- R. Install conduits in a manner so as to ensure against collection of trapped condensation. Arrange all runs of conduit so as to be devoid of traps. Provide trapped conduit runs with explosion proof drains at low points.
- S. At hazardous locations, install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed non-shrink sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces.
- T. Coordinate with other trades, including metal and concrete deck trades, as necessary to interface installation of electrical raceways and components.
- U. Complete installation of electrical raceways before starting installation of cables or wires within raceways.

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- V. Take precautions to prevent the lodgment of dirt, plaster, or trash in all conduit or tubing, fittings and boxes during construction. Use mandrel to clean all conduit for floor boxes or conduit below grade and ensure its swabbed free of debris or moisture before wiring is installed.
- W. Unless using ERMCS, do not locate conduits, cables, raceways, and enclosures within 2 inches of bottom of metal-corrugated sheet roof decking, measured from the lowest surface of the roof decking to the top of the conduit, cable, raceway, or box.
- X. Conduits, cables, raceways, and enclosures are not permitted in concealed locations of metal-corrugated sheet decking type roofing.
- Y. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72-inches of flexible conduit for ceiling mounted recessed and semi-recessed luminaires, and 36-inches for all other equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
 - 1. Install as a single piece with clamp-on insulated throat connectors designed for the purpose.
 - 2. Provide strain relief fittings where subject to vibration.
 - 3. Provide an equipment grounding conductor and bonding jumper at all locations.
 - 4. For LPMC, provide a minimum of 18-inches and loop to avoid restraining vibrating equipment.
- Z. Stub-ups to Accessible Ceilings:
 - 1. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or into an enclosure.
 - 2. Where conduits terminate at a cable tray pathway, provide listed fitting to secure conduit to cable tray.
- AA. Mechanically fasten conduit terminations at a wireway, provide metal insulated bushings, and bond to the wireway with bonding jumper.
- BB. Furnish conduit bodies in proper configurations, avoiding excessive openings. Any openings that are left shall be properly plugged. Wiring splices within conduit bodies are not permitted.
- CC. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- DD. Provide a completely separate raceway system, including junction boxes and pull-boxes, for each emergency power, optional stand-by, and normal power system for complete separation in accordance with NEC.
- EE. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of secured slack at each end of pull wire. Secure pull string at each end and cap raceways.
- FF. Coordinate with vendors and provide extra pull-strings as required to ensure sufficient number of pull strings.

- GG. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length. Ream inside of conduit to remove burrs.
- HH. Raceway Fittings: Install fittings in accordance with NEMA FB 2.10 guidelines
 - 1. Install raceways square to enclosures and terminate with appropriate fitting:
 - 2. For enclosures without hubs, terminate with appropriate fitting, insulated throat liner, and case-hardened locknuts on both sides of enclosure wall.
 - 3. Terminate rigid conduits with threaded hubs or with locknuts on inside and outside of enclosure and insulated throat metal bushing.
 - 4. Install locknuts hand tight, plus one-quarter turn more.
 - 5. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
 - 6. All threaded fittings shall engage a minimum of seven full threads. Fasteners shall be properly torqued to manufacturer's recommendations.
 - 7. Split sleeve insulators are not permitted.
- II. Comply with manufacturer's written instructions for solvent welding RNC and fittings.
- JJ. Expansion-Joint Fittings:
 - 1. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
 - 2. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.
- KK. Where raceways penetrate rooms or walls with acoustical requirements, seal raceway openings on both sides of penetration with acoustically rated putty or sealant.
- LL. Surface Raceways:
 - 1. Provide surface metal raceways where indicated on drawings or approved by the Engineer.
 - 2. Provide all trim and cover fittings, flush feed boxes, splices, and outlet fittings necessary for a complete installation.
 - 3. Provide multi service raceway with divider for locations that require power and low-voltage wiring.
 - 4. Install surface raceway with a minimum 2-inch radius control at bend points.
 - 5. Secure surface raceway with two-hole straps at intervals not exceeding 24-inches and within 6-inches of boxes, transitions, and turns. Provide no less than two supports per straight raceway section. Support surface raceway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.
 - 6. Provide box connector and junction box immediately above ceiling for transitioning raceway to conduit.

3.3 BOX AND ENCLOSURE INSTALLATION

- A. Provide electrical outlets and enclosures as required for splices, taps, wire pulling, and equipment connections.

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- B. Provide pull boxes as required to maintain conduit run and bend limitations specified herein.
- C. Size all outlets, pull boxes, junction boxes, cabinets, etc., per adopted edition of the National Electrical Code.
- D. Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- E. Install interior and exterior outlet boxes recessed in building construction with face or cover flush with finished surfaces unless noted otherwise. Where outlet boxes are installed in walls of glazed tile, brick, concrete block, or in walls covered by wood wainscot or paneling, provide deep box to ensure the outlet boxes are installed straight and secure in walls.
- F. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements and architectural elevations. Install boxes with height measured to center of box unless otherwise indicated.
- G. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box. Do not split the mortar joint
- H. Provided 3/4-inch rigid conduit pendants where lighting fixtures, appliances, or wiring devices are to be suspended from ceiling outlet boxes. Outlet boxes shall be malleable iron, provided with self-aligning covers with swivel ball joint and #14 gauge steel locking ring. Provide safety chain between building structure and housing for all fixtures, appliances or devices greater than 10 lbs weight. Install fixtures plumb and level. Cover pendants shall be finished to match fixtures.
- I. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- J. Locate boxes so that cover or plate does not span different building finishes.
- K. Provide spanner bars to support all boxes from more than one side by spanning two framing members.
- L. Fasten boxes up to 4-11/16 square size to their mounting surface or support with two fasteners of proper size. Fasten larger sizes with four fasteners, minimum.
- M. Support boxes recessed in ceilings independent of ceiling tiles and ceiling grid.
- N. Fasten junction and pull boxes to, or support from, building structure. Do not support boxes by conduits or ceiling support wires.
- O. Provide all cabinets and boxes for NEMA 1 applications with knockouts, as necessary, or field cut with approved cutting tools which will provide a clean, symmetrically cut opening to maintain UL listing of enclosure.
- P. Replace any unused knockouts or openings with a listed knockout closure.

- Q. Coordinate with equipment vendors to provide special sized outlet boxes to support installed equipment.
- R. Where boxes and enclosures are located in areas or on walls with acoustical requirements, seal openings and knockouts in back and sides of boxes with acoustically rated putty or sealant and provide gasket for wall plates and covers.

3.4 GROUNDING AND BONDING

- A. Comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems".
- B. Where conductors are spliced or terminated within a box, or supported by a box, bond metal box with pigtail to the equipment grounding conductor.
- C. Provide insulated throat grounding bushings with appropriately sized bonding jumpers for the following locations to maintain electrical continuity between the raceway and enclosure:
 - 1. Metal raceways and enclosures that contain service conductors.
 - 2. Metal raceways and enclosures that contain grounding electrode conductors.
 - 3. Where metal raceways containing circuits over 250V terminate in a concentric or eccentric knockout at cabinets, enclosures, or sheet metal pull boxes listed in accordance with UL 50.
 - 4. Where the integrity of a concentric or eccentric knockout has been compromised.
 - 5. Metal raceways and enclosures that contain feeders.

3.5 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.
- B. Protect threads on conduits and fittings with plastic protectors or other means to prevent damage prior to installation.
- C. Provide protection for all conduit stubbed through floor during construction with plastic caps approved for this purpose.

3.6 IDENTIFICATION

- A. Comply with requirements in Section 260553 "Identification for Electrical Systems."
- B. Identify all junction, outlet and pull boxes in data/mechanical/electrical rooms and above ceilings with panel and circuit designation on outside of covers. Identify all exposed junction, outlet and pull boxes in finished areas with panel and circuit designation on inside of covers.

3.7 PAINTING

- A. Raceways installed in exterior locations shall receive one coat of primer, two coats finish paint after preparation of galvanizing, color selected by Architect.
- B. Exposed raceways in painted interior areas shall be painted to match adjacent finishes.

END OF SECTION

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SECTION 26 05 53

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General, Special and Supplementary Conditions, Division 01 Specification Sections, and Section 260010 “General Requirements for Electrical Systems” apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Equipment Nameplates.
 - 2. Cable and Conductor Labels.
 - 3. Wiring Device Labels
 - 4. Safety Labels.
 - 5. Instruction Signs.
 - 6. Miscellaneous identification products.

1.3 REFERENCES

- A. Abbreviations
- B. Definitions
 - 1. Emergency Systems: Those systems legally required and classed as emergency by NFPA 70 Article 700, municipal, state, other codes, or by any government agency having jurisdiction.
- C. Reference Standards: The following publications are referred to in the text by the basic designation only. The edition/revision of the referenced publications shall be the latest version as of the date of the Contract Documents, unless otherwise specified.
 - 1. American National Standards Institute (ANSI)
 - a. ANSI Z535.4, “Product Safety Signs and Labels”
 - 2. National Fire Protection Association (NFPA)
 - a. NFPA 70E, “Standard for Electrical Safety in the Workplace”
 - 3. Occupational Safety and Health Administration (OSHA)
 - a. 29 CFR 1910.144, “Safety color code for marking physical hazards”
 - b. 29 CFR 1910.145, “Specifications for accident prevention signs and tags”
 - 4. Underwriters Laboratories Inc (UL)

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- a. UL 969, "Marking and Labeling Systems"

1.4 SUBMITTALS

- A. Product Data: For each electrical identification product indicated.
 - 1. Include project specific examples of each label type.
- B. Identification Schedule: An index of nomenclature of electrical equipment and system components used in identification signs and labels.
- C. Closeout Submittal:
 - 1. In addition to items specified in Division 01 and Section 260010 "General Requirements for Electrical Systems", include the following:
 - a. Provide electronic Excel files of all panelboard directories to owner as part of Close-out Documentation.

1.5 COORDINATION

- A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes and standards. Use consistent designations throughout Project.
- B. All identifications shall be consistent with the owner's standard practices, especially within existing facilities, unless otherwise require by codes. Where the requirements herein are in conflict, the contractor shall notify the engineer in writing prior to ordering any material.
- C. All room names and/or numbers for labeling or programming shall use the Owner's approved room name and numbering scheme, not names and numbers indicated on floor plans. All reprogramming shall be included as required to accommodate construction phasing.
- D. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- E. Coordinate installation of identifying devices with location of access panels and doors.
- F. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 EQUIPMENT SIGNS AND NAMEPLATES

- A. Engraved Plastic Signs and Nameplates.
 - 1. 3-layer melamine plastic laminate
 - 2. Weather and UV-resistant for Wet and Damp Locations.
 - 3. Thickness:

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- a. For signs up to 20 sq. in., minimum 1/16 inch thick.
 - b. For signs larger than 20 sq. in. or 8 inches in length, 1/8 inch thick.
 - c. Punched or drilled for mechanical fasteners with 1/4-inch grommets in corners for mounting.
 - d. Framed with mitered melamine molding and arranged for attachment at applicable equipment.
4. Color: Comply with color legend.

2.2 RACEWAY AND CONDUCTOR LABELS

- A. Raceway Labels: Pre-printed, self-adhesive, polyester, suitable for indoor or outdoor use, resistant to abrasion, humidity, and weather.
 - 1. Color: Black Letters on an orange field.
 - 2. Size: For each raceway size, comply with ANSI/ASME A13.1 for recommended letter height and field length.
- B. Wire and Cable Labels: Machine printed, self-adhesive, polyester, self-laminating, suitable for indoor or outdoor use on flexible cables, resistant to abrasion, humidity, and weather.

2.3 SAFETY SIGNS AND LABELS

- A. Comply with NFPA 70 and 29 CFR 1910.145.
- B. All field-applied hazard markings shall warn of hazards using effective words, colors, symbols, or any combination thereof as recommended by ANSI Z535.4-2011. This applies to all instances where caution, warning, or danger signs are required per the NEC and applicable OSHA standards.
- C. Self-Adhesive Safety Labels: Polyester, Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for intended use and suitable for installed environment.
- D. Provide UV overlaminating film for outdoor locations.

2.4 INSTRUCTION SIGNS

- A. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch.
- B. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch. Overlay shall provide a weatherproof and UV-resistant seal for label.

2.5 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Floor Marking Tape: 2-inch wide, 5-mil pressure-sensitive vinyl tape, with black and white stripes and clear vinyl overlay.

- B. Paint: Comply with requirements in Division 09 painting Sections for paint materials and application requirements. Select paint system suitable for surface material and location (exterior or interior).
- C. Fasteners for Labels and Signs:
 - 1. Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.
 - 2. Pop-Rivets.
 - 3. Two-Part Epoxy Adhesive
- D. Cable Ties: Self-extinguishing, one-piece, self-locking, UV-stabilized or plenum rated where required by installed environmental conditions. 3/16-inch minimum width.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Verify identity of each item before installing identification products.
- B. Before installation of labels, clean all surfaces using materials and methods recommended by manufacturer of identification device.
- C. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.
- D. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- E. Install all labels in a neat manner, plumb and parallel to equipment lines.
- F. Attach plastic signs and labels to equipment with mechanical fasteners appropriate to the location and substrate. Where screws cannot or should not penetrate substrate use two-part epoxy adhesive listed for use with intended substrate and environmental conditions.
- G. Hand written, non-permanent, or stenciled labels are not permitted unless noted otherwise.
- H. For surfaces that require finish work, apply identification devices to surfaces after completing finish work.
- I. Identification shall consist of all UPPER-CASE LETTERS.
- J. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from the floor.

3.2 EQUIPMENT IDENTIFICATION

- A. Provide all new and modified equipment with a nameplate consisting of 1/2" letters for equipment designation and 1/4" letters for voltage, source, and feeder information. This

includes but is not limited to panelboards, switchboards, switchgear, disconnect switches, transformers, power transfer equipment, generators, motor starters, variable frequency drives, lighting control panels, contactors, cabinets, push button stations, and auxiliary system control panels.

- B. Distribution equipment labels shall indicate the following:
 - 1. Equipment designation.
 - 2. Voltage system.
 - 3. Equipment ampacity.
 - 4. Source equipment designation and location.
 - 5. Feeder size.
- C. Transformer labels shall indicate the following:
 - 1. Equipment designation.
 - 2. Primary voltage system and primary feeder ampacity.
 - 3. Source equipment designation and location.
 - 4. Primary feeder size.
 - 5. Secondary voltage system and load equipment designation
- D. Equipment disconnect labels shall indicate the following:
 - 1. Equipment designation.
 - 2. Voltage system and feeder ampacity
 - 3. Source equipment designation and location.
- E. Locate equipment nameplates at center of top of trim for panelboards, switchboards, switchgear, and centered at side for branch circuit switches.
- F. Where equipment is provided with a factory installed disconnecting means or motor controller, install label on factory provided unit.
- G. For equipment with multiple power sources, such as transfer switches and control panels, identify each source and its function.
- H. Color Legend
 - 1. Normal Power Systems: Black field with white letters
 - 2. Emergency Power Systems (As defined by NEC Article 700): Red field with white letters.
- I. Where electrical distribution equipment, including panelboards, switchboards and switchgear, are connected to an emergency source, the nameplate shall incorporate the word "EMERGENCY" into the legend. Refer to drawings for further details.
- J. Where the premise wiring system has feeders and/or branch circuits supplied from more than one nominal voltage system, provide sign at each switchgear, switchboard, and panelboard displaying color coded identification method for each ungrounded, grounded, and equipment grounding conductor.
- K. Service Equipment and Building Feeder, Branch Circuit Disconnects.
 - 1. Provide label for service disconnecting means to permanently identify it as the "SERVICE DISCONNECT".

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2. Where a building or structure has any combination of feeders, branch circuits, or services passing through it or supplying it, provide a permanent sign at each disconnect location identifying all other feeders, branch circuits, or services and the area served by each.

3.3 IDENTIFICATION OF CONDUCTORS

- A. Service, Feeder, and Branch-Circuit Conductors: Refer to Section 260519, “Low Voltage Electrical Power Conductors and Cables” for conductor and cable color coding requirements.
- B. Indicate source and circuit number of conductors to be extended in the future.
- C. Auxiliary Systems Alarm, Signal, and Control Wire Identification: At termination points, identify each conductor by its system, designation, and function.

3.4 IDENTIFICATION OF RACEWAYS AND BOXES

- A. Identify all junction, outlet, device, and pull boxes with wiring system, voltage, and circuit designations of conductors.
 1. In concealed locations above accessible ceilings and in exposed unfinished areas such as data, mechanical, or electrical rooms, provide designations on outside of box covers.
 2. For exposed boxes in finished areas, provide designations on inside of box covers.
 3. System Legend shall be as follows:
 - a. Power
 - b. Emergency
 - c. UPS
- B. The inside of all junction and backboxes shall be marked with panel and circuit number in permanent marker.
- C. All empty conduit runs and conduit with conductors for future use shall be identified for use and shall indicate where they terminate.

3.5 IDENTIFICATION OF WIRING DEVICES

- A. All new and existing receptacle cover plates in area of work shall be marked with their panel and circuit number(s) with clear, machine printed adhesive labels with black lettering.

3.6 CIRCUIT DIRECTORIES

- A. For Distribution Panelboards, Motor Control Centers, Switchboards, and Switchgear provide nameplates at each switch or circuit breaker to indicate load designation.
- B. Provide clearly legible typewritten directories in each electrical panel indicating the area, item of equipment, etc. controlled by each switch, breaker, fuse, etc. Insert directories into plastic cardholders on the back of the door in each panel. Provide descriptions that identify each circuit as to its clear, evident, and specific purpose or use. The identification shall include an approved

degree of detail that allows each circuit to be distinguished from all others. Spaces and Spare positions shall be described accordingly.

1. At a minimum, provide the following panel information for each panel directory:
 - a. Panel name
 - b. Panel bus rating
 - c. Voltage System
 - d. Mains Configuration and Rating
 - e. Short Circuit Current Rating
2. Circuit Designation Examples:
 - a. LIGHTS, ROOM 100
 - b. FLOOR RECEPTACLES, ROOM 200
 - c. ERV-1 RECEPTACLE, ROOF

C. Panel Schedules and circuit numbers on Record Drawings shall match.

3.7 SAFETY SIGNS

- A. Install Warning, Caution, and Danger signs in accordance with NFPA 70 and OSHA requirements to ensure safe operation of electrical equipment and the items to which they connect.
- B. Comply with 29 CFR 1910.145 and ANSI Z535.4.
- C. Apply to exterior of door, cover, or other access point.
- D. Labels and signs shall include, but are not limited to, the following legends:
 1. Identify system voltage with black letters on an orange background.
 2. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
 3. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES"
 4. Where series combination ratings are allowed: "CAUTION - SERIES COMBINATION SYSTEM RATED ____ AMPERES. IDENTIFIED REPLACEMENT COMPONENTS REQUIRED."

3.8 INSTRUCTION SIGNS

- A. Operating Instruction Signs: Install instruction signs with minimum 3/8-inch letters to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation, power transfer, and load shedding.

3.9 WORKSPACE INDICATION

- A. Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.

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END OF SECTION

SECTION 26 28 13

FUSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General, Special and Supplementary Conditions, Division 01 Specification Sections, and Section 260010 "General Requirements for Electrical Systems" apply to this Section.

1.2 SUMMARY

- A. Description: Provide labor, material, equipment, related services, and supervision required for the installation of cartridge fuses where utilized for overcurrent and/or current limitation applications.
- B. Section Includes:
 - 1. Cartridge fuses rated 600V-AC and less for use in control circuits, enclosed switches, panelboards, switchboards, and motor controllers.
 - 2. Spare fuse cabinet.

1.3 REFERENCES

- A. Definitions
 - 1. Fuse: A protective device that opens a circuit during specified overcurrent conditions by means of a current responsive element.
- B. Reference Standards: The following publications are referred to in the text by the basic designation only. The edition/revision of the referenced publications shall be the latest version as of the date of the Contract Documents, unless otherwise specified.
 - 1. National Electrical Contractors Association (NECA)
 - a. NECA 420, "Fuse Applications"

1.4 SUBMITTALS

- A. Product Data: For each fuse type indicated:
 - 1. Include let-through current curves for fuses with current-limiting characteristics.
 - 2. Time-current curves, coordination charts and tables, and related data.
- B. Ambient Temperature Adjustment Information: Where ratings of fuses have been adjusted to accommodate ambient temperatures, provide list of fuses with adjusted ratings.

1. For each fuse having adjusted ratings, include location of fuse, original fuse rating, local ambient temperature, and adjusted fuse rating.
2. Provide manufacturer's technical data on which ambient temperature adjustment calculations are based.

C. Closeout Submittals

1. Operation and Maintenance Data: For Fuses include in emergency, operation, and maintenance manuals.
2. In addition to items specified in Division 01 and Section 260010 "General Requirements for Electrical Systems", include the following:
 - a. Let-through current curves for fuses with current-limiting characteristics.
 - b. Time-current curves, coordination charts and tables, and related data.
 - c. Ambient temperature adjustment information.

1.5 COORDINATION

- A. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size and with system short-circuit current levels indicated in power system study.

1.6 MAINTENANCE MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Fuses: Equal to one spare for every 10 installed units, but not less than 5 units for each size and type.
 2. Fuse Pullers: Two for each size and type.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to replace fuses that fail in materials or workmanship within 12 months from date of Substantial Completion.

1.8 FIELD CONDITIONS

- A. Where ambient temperature to which fuses are exposed is less than 40 deg F or more than 100 deg F, apply manufacturer's ambient temperature adjustment factors to fuse ratings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Bussmann, Inc.

2. Littlefuse, Inc.
 3. Mersen USA.
- B. Source Limitations: Obtain fuses, for use within a specific product or circuit, from single source from single manufacturer.

2.2 GENERAL REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with:
1. NEMA FU 1 – Low Voltage Cartridge Fuses.
 2. UL 248 – Standard for Low Voltage Fuses.
 3. UL 512 – Fuseholders.

2.3 CARTRIDGE FUSES

- A. Characteristics: NEMA FU 1, current limiting, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.
1. Type RK-1: 250 or 600-V, zero- to 600-A rating, 200 kAIC minimum, fast acting or time delay.
 2. Type RK-5: 250 or 600-V, zero- to 600-A rating, 200 kAIC minimum, fast acting or time delay.
 3. Type CC: 600-V, zero- to 30-A rating, 200 kAIC minimum, fast acting or time delay.
 4. Type L: 600-V, 601- to 6000-A rating, 200 kAIC minimum, time delay option.
- B. Voltage: Rating suitable for circuit phase-to-phase voltage.
- C. Provide dual element fuses with separate overload and short circuit elements.

2.4 SPARE-FUSE CABINET

- A. Manufacturer: Bussmann #SFC-FUSE-CAB spare fuse cabinet or equal.
- B. Characteristics: Wall-mounted steel unit with full-length, recessed piano-hinged door and key-coded cam lock and pull.
1. Size: Adequate for storage of spare fuses specified with 15 percent spare capacity minimum.
 2. Finish: Gray, baked enamel.
 3. Identification: "SPARE FUSES" in 1-1/2 inch high white letters on black lamicoid plate. Mount plate on exterior of door.
 4. Fuse Pullers: For each size of fuse, where applicable and available, from fuse manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fuses before installation. Reject fuses that are moisture damaged or physically damaged.
- B. Examine holders to receive fuses for compliance with installation tolerances and other conditions affecting performance, such as rejection features.
- C. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.
- D. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 FUSE APPLICATIONS

- A. Service, Feeders, and Branch Circuits (601-6000A): Class L, time delay. Bussmann HI-CAP Fuses KRP-C or equal. Fuses shall hold 500% of rated current for a minimum of 4 seconds.
- B. Feeders and Branch Circuits (0-600A): Class RK1, time delay. Bussmann Low-Peak Dual Element Fuses, LPN-RK (250 volts) or LPS-RK (600 volts) or equal. The fuse shall hold 500% of rated current for a minimum of 10 seconds.
- C. Motor Circuits – Class RK1 or Class L, time delay as indicated above.
 - 1. Motor with 1.15 service factor: Size at 125% of motor FLA. For high inrush current applications size 150% to 200% of motor FLA.
 - 2. Motor with 1.0 service factor: Size at 115% of motor FLA.
- D. Control Circuits: Class CC, time delay. Bussmann Low-Peak Fuses LP-CC or equal. Fuses shall hold 200% of rated current for a minimum of 12 seconds.
- E. Adjust fuse type and selection as required to ensure available fault current at equipment controllers indicated in power systems study does not exceed labeled SCCR values.

3.3 INSTALLATION

- A. Fuses shall be shipped separately. Any fuses shipped installed in equipment, shall be replaced by the Electrical Contractor with new fuses as specified above prior to energizing at no additional expense to Owner. All fuses shall be stored in moisture free packaging at job site and shall be installed immediately prior to energizing of the circuit in which it is applied.
- B. No fuses shall be installed in the equipment until the installation is complete, including tests and inspections required prior to being energized. All fuses shall be of the same manufacturer to ensure retention of selective coordination, as designed.

- C. Provide a complete set of fuses for all fusible devices. Arrange fuses so rating information is readable without removing fuse.
- D. Install spare-fuse cabinet(s). Locate in Main Electrical Room.
- E. Upon completion of the building, the Contractor shall provide the Owner with spare fuses in Spare-Fuse Cabinet.

3.4 IDENTIFICATION

- A. Install labels complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems".
 - 1. Indicate fuse rating and type on the outside door of each fused switch.

END OF SECTION

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SECTION 26 28 16

ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General, Special and Supplementary Conditions, Division 01 Specification Sections, and Section 260010 "General Requirements for Electrical Systems" apply to this Section.

1.2 SUMMARY

- A. Description: Section includes requirements for the provision of individually enclosed switches and circuit breakers including manufacturing, fabrication, configuration and installation as required for the complete performance of the Work, as shown on the drawings and specifications
- B. Section includes:
 - 1. Fusible and Non-Fusible Switches.
 - 2. Enclosed Circuit Breakers.
 - 3. Enclosures.

1.3 REFERENCES

- A. Abbreviations
 - 1. HD: Heavy Duty
 - 2. MCCB: Molded Case Circuit Breaker
 - 3. NC: Normally Closed
 - 4. NO: Normally Open
 - 5. SCCR: Short Circuit Current Rating
- B. Definitions
 - 1. Disconnect: A switch, device, group of devices, or other means used to disconnect conductors of a circuit from their source of supply.
 - 2. Switch (switching device): A device, manually operated, unless otherwise designated, for opening and closing or for changing the connection of a circuit. Also referred to as safety switches or disconnect switches.

1.4 SUBMITTALS

- A. Product Data: For each product type.

ENCLOSED SWITCHES AND CIRCUIT BREAKERS 26 28 16 - 1

1. Enclosure types and details for types other than NEMA 250, Type 1.
 2. Short-circuit current ratings (interrupting and withstand, as appropriate).
 3. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
- B. Shop Drawings: For each type of enclosed switch, circuit breaker, accessory, and component indicated.
1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.
 2. Detail enclosure types and details for types other than NEMA 250, Type 1.
 3. Detail bus configuration, current, and voltage ratings.
 4. Short-circuit current rating of overcurrent protective devices.
 5. Include evidence of NRTL listing for series rating of installed devices.
 6. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
 7. Include wiring diagrams for power, signal, and control wiring.
 8. Cable terminal size and quantity.
- C. Closeout Submittals
1. Operation and Maintenance Data: For enclosed switches and circuit breakers include in emergency, operation, and maintenance manuals.
 2. In addition to items specified in Division 01 and Section 260010 "General Requirements for Electrical Systems", include the following:
 - a. Time-current curves, including selectable ranges for each type of overcurrent protective device that allows adjustments.

1.5 COORDINATION

- A. Product Selection for Restricted Space: Drawings indicate space available for enclosed switches including clearances between enclosed switches and adjacent surfaces and other items. Furnish and install equipment to comply with NEC clearances.

1.6 WARRANTY

- A. Manufacturer's Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace devices that fail in materials or workmanship within 12 months from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. ABB/General Electric.

ENCLOSED SWITCHES AND CIRCUIT BREAKERS 26 28 16 - 2

2. Eaton Electrical Inc.
3. Siemens.
4. Square D

- B. Source Limitations: Obtain enclosed switches, overcurrent protection devices, and all other electrical distribution equipment through one source from a single manufacturer unless approved otherwise.

2.2 GENERAL REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.
- C. Service-Rated Switches and Circuit Breakers: Labeled for use as service equipment.
- D. Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals. Switch and overcurrent protective device short circuit ratings shall be at least 110% of the actual available fault current.

2.3 FUSIBLE AND NON-FUSIBLE SWITCHES

- A. Type HD, Heavy Duty, Single Throw, 250-VAC or 600-VAC, 1200 A and Smaller unless noted otherwise.
- B. Quick-make, quick-break operating handle and switch mechanism integral to box.
- C. UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate fuses where indicated.
- D. Externally operable dual interlocked handle to prevent opening front cover with switch in ON position, or closing switch when door is open. Visible load interrupter knife switch blades in the off position with door open.
- E. Lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- F. All current carrying parts shall be plated by an electrolytic process to resist corrosion and to promote cooling.
- G. Accessories:
 1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.

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3. Lugs: UL Listed, mechanical type, front removeable, and suitable for number, size, and conductor material at 75 deg C.
 4. Auxiliary Contact Kit: NO/NC (Form "C") auxiliary contact(s), arranged to activate before switch blades open. Contact rating as required for application.
 5. Electrical Interlock Kit: Pivot arm operated from the switch mechanism, breaking a control circuit before the main switch blades break.
- H. For receptacle switches provide interlocking linkage between the receptacle and switch mechanism to prevent inserting or removing plug while switch is in the on position, inserting any plug other than specified, and turning switch on if an incorrect plug is inserted or correct plug has not been fully inserted into the receptacle.

2.4 ENCLOSED MOLDED-CASE CIRCUIT BREAKERS

- A. General Requirements: Comply with UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents.
- B. Circuit breakers shall be constructed using glass-reinforced insulating material. Current carrying components shall be completely isolated from the handle and the accessory mounting area.
- C. Circuit breakers shall have a toggle operating mechanism with common tripping of all poles, which provides quick-make, quick-break contact action. The circuit-breaker handle shall be over center, be trip free, and reside in a tripped position between on and off to provide local trip indication. Circuit-breaker escutcheon shall be clearly marked on and off in addition to providing international I/O markings. Equip circuit breaker with a push-to-trip button, located on the face of the circuit breaker to mechanically operate the circuit-breaker tripping mechanism for maintenance and testing purposes.
- D. MCCBs shall be equipped with a device for locking in the open position.
- E. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
- F. Electronic Trip Circuit Breakers: Field-replaceable rating plug, rms sensing, with the following field-adjustable settings:
 1. Long-time, Short-time, and Instantaneous trip unless noted otherwise on drawings.
- G. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller, and let-through ratings less than NEMA FU 1, RK-5.
- H. Ground-Fault, Circuit-Interrupter (GFCI) Circuit Breakers: Single-, two-pole, and three-pole configurations with Class A ground-fault protection (6-mA trip).
- I. Ground-Fault Equipment-Protection (GFEP) Circuit Breakers: With Class B ground-fault protection (30-mA trip).
- J. Features and Accessories:

ENCLOSED SWITCHES AND CIRCUIT BREAKERS 26 28 16 - 4

1. Standard frame sizes, trip ratings, and number of poles.
2. Lugs: UL Listed, mechanical type, suitable for number, size, trip ratings, and conductor material at 75 deg C.
3. Ground-Fault Protection: Comply with UL 1053; integrally mounted, self-powered type with mechanical ground-fault indicator; relay with adjustable pickup and time-delay settings, push-to-test feature, internal memory, and shunt trip unit; and three-phase, zero-sequence current transformer/sensor.
4. Shunt Trip: Trip coil energized from separate circuit, with coil-clearing contact. Coordinate coil voltage and provide control circuits as required for application.

2.5 ENCLOSURES

- A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
 1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
 2. Outdoor and Wet Locations: NEMA 250, Type 3R.
 3. Kitchen and Wash-Down Areas: NEMA 250, Type 3R, stainless steel.
- B. Enclosure Finish: The enclosure shall be finished with the standard manufacturer gray finish.
- C. Conduit Entry: NEMA 250 Types 4, 4X, and 12 enclosures shall contain no knockouts.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- C. Securely fasten each switch and circuit breaker to the supporting structure or wall, utilizing a minimum of four (4) 1/4-inch bolts. Do not mount in an inaccessible location or where the passageway to the switch may become obstructed.
- D. After equipment has been installed, inspected, and is ready to be energized, install fuses in fusible devices in accordance with equipment nameplates and Section 262816, "Fuses".

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- E. Comply with NFPA 70 and NECA 1.
- F. Provide electrical interlock kit and low voltage wiring where utilized on the line side of VFD controller to shut down VFD prior to disconnection of power. Coordinate control wire termination with Division 25.
- G. Provide electronic trip breakers where required to achieve performance requirements
- H. Provide fusible switches with current limiting fuses or current limiting circuit breaker for equipment disconnecting means where equipment short circuit current rating is insufficient for available fault current.
- I. Where battery lowering devices are specified with Elevators, provide connection between an auxiliary contact at the elevator disconnect and the battery lowering device.
- J. Where enclosed breakers or switched are provided on the load side of a VFD, provide connection between and auxiliary contact at the disconnect and the VFD that will trigger a freewheel stop on the VFD before the disconnect contacts open.

3.3 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B. Where a tightening torque is indicated as a numeric value on equipment or in installation instructions provided by the manufacturer, use a calibrated torque tool to achieve that indicated torque value, unless the equipment manufacturer has provided installation instructions for an alternative method of achieving the required torque.

3.4 IDENTIFICATION

- A. Comply with requirements in Section 260553, "Identification for Electrical Systems"
 - 1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
 - 2. Label each enclosure with nameplate.

3.5 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Visual and Mechanical Inspection:
 - a. Examine equipment nameplate data and confirm proper identification.
 - b. Verify and record fuses sizes and types are in accordance with nameplates and power systems study.
 - c. Inspect the physical, electrical, and mechanical condition of the equipment and all components in accordance with the manufacturers' instructions.
 - d. Inspect anchorage, alignment, and grounding.

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- e. Inspect bolted electrical connections and terminations for high resistance by verifying tightness with calibrated torque-wrench method in accordance with manufacturer's published data.
 - f. Exercise all active components to ensure proper mechanical operation.
 - g. Check all interlocking systems for correct operation.
- 2. Circuit Breaker Testing: For all circuit breakers with electronic trip units, determine minimum pickup current, long-time and short-time pickup and delay, and instantaneous pickup by secondary current injection. Certify compliance with test parameters and ensure settings match recommendations from final approved power system study.
 - 3. Test ground-fault protection of equipment for service equipment per NFPA 70.
 - 4. Test all auxiliary devices/system interfaces and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.
- B. Switches and Circuit Breakers will be considered defective if they do not pass tests and inspections.
 - C. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
 - D. Prepare test and inspection reports, including a certified report that identifies switches and circuit breakers included and that describes results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.6 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

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SECTION 26 29 00

MOTOR CONTROLLERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General, Special and Supplementary Conditions, Division 01 Specification Sections, and Section 260010 "General Requirements for Electrical Systems" apply to this Section.

1.2 SUMMARY:

- A. Extent of motor starter work is indicated by drawings and schedules.
- B. Section includes:
 - 1. Combination full voltage, non-reversing Motor Controllers.
 - 2. Combination Soft Start Motor Controllers
- C. Related Requirements:
 - 1. Refer to Section 260500 "Common Work Results for Electrical Systems" for additional requirements related to motors connections.
 - 2. Refer to Section 262726 "Wiring Devices" for information on manual motor controllers.
 - 3. Refer to Division 25 for coordinating requirements related to control system interface points.

1.3 REFERENCES

- A. Abbreviations
 - 1. FVNR: Full Voltage Non Reversing
 - 2. MCP: Motor Circuit Protector
 - 3. OCPD: Overcurrent protective device
 - 4. SCCR: Short Circuit Current Rating
 - 5. SCPD: Short-circuit protective device
 - 6. SCR: Silicon Controlled Rectifier
- B. Definitions
 - 1. Soft Starter: Solid state reduced voltage non-reversing motor controller

1.4 SUBMITTALS:

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

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- B. Shop Drawings: For each type of product.
 - 1. Include wiring diagrams for signal and control wiring. Clearly identify manufacturer-installed and field installed wiring.
 - 2. Include features and factory settings of individual protective devices and auxiliary components.
- C. Closeout Submittal:
 - 1. Operation and Maintenance Data: For motor controllers to include in operation and maintenance manuals.
 - 2. In addition to items specified in Division 01 and Section 260010 "General Requirements for Electrical Systems", include the following:
 - a. Routine maintenance requirements for magnetic controllers and installed components.
 - b. Manufacturer's written instructions for testing and adjusting circuit breaker and motor circuit protector trip settings.
 - c. Manufacturer's written instructions for setting field-adjustable overload relays.
 - d. Load-Current and List of Settings of Adjustable Overload Relays: Compile after motors have been installed, and arrange to demonstrate that switch settings for motor-running overload protection suit actual motors to be protected.

1.5 MAINTENANCE MATERIAL

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Fuses: Equal to one spare for every 10 installed units, but not less than 5 units for each size and type.
 - 2. Overloads: Equal to one spare for every 9 installed units, but not less than 3 units for each size and type.

1.6 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace enclosures, starters, overcurrent protective devices, accessories, and factory installed interconnection wiring that fail in materials or workmanship within 12 months from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS:

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
- B. UL Compliance and Labeling: Fabricate and label motor controllers to comply with UL 508.

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- C. NEC Compliance: Comply with NEC as applicable to wiring methods, construction and installation of motor starters.
- D. NEMA Compliance: Comply with applicable portions of NEMA standards pertaining to motor controllers/starters and enclosures.

2.2 MANUFACTURERS:

- A. Manufacturer: Subject to compliance with requirements, provide products from one of the following:
 - 1. ABB/General Electric
 - 2. Allen Bradley Co.
 - 3. Eaton
 - 4. Siemens.
 - 5. Square D. Co.

2.3 MANUAL MOTOR CONTROLLERS

- A. Refer to Section 262726 “Wiring Devices” for manual motor controller requirements.

2.4 COMBINATION FULL VOLTAGE MOTOR CONTROLLER

- A. Description: Factory-assembled, combination full-voltage, non-reversing magnetic motor controller consisting of the controller, indicated disconnecting means, SCPD, OCPD, pushbuttons, selector switch(es), and indicator lights in a single enclosure.
- B. All combination starter/disconnect switches shall have low-voltage protection, solid state overloads, start / stop pushbuttons, Hand-Off-Auto selector switch and Red and Green pilot lights.
- C. All combination starter/disconnect switches shall be Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- D. Combination motor starters shall be rated in accordance with NEMA sizes and horsepower ratings. No starter shall be listed as a fractional size. Contactor contacts shall be silver alloy, double break, and shall allow for inspection on NEMA Sizes 00 through 4 without the use of tools. Size 5 and larger shall allow for inspection utilizing standard tools. They shall be replaceable without removing the line, load, or control wiring from the starter, and replaceable without removing the starter from the enclosure.
- E. Contactor coils shall be the encapsulated type, and shall be replaceable on NEMA Sizes 00 through 4 without the use of tools. Size 5 and larger shall be replaceable with standard tools. They shall be replaceable without removing the line, load, or control wiring from the starter, and replaceable without removing the starter from the enclosure.
- F. Overload protection shall be provided by solid state electronic overload relay. Single-phase starters shall provide one- or two-leg overload protection; three-phase starters shall provide three-

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leg overload protection. Overload protection shall be class 10/20 selectable, have visible trip indicator, and manual or remote reset function.

- G. Starter shall include phase failure relay with under-voltage protection.
- H. Starter shall have integral controls transformer with primary and secondary fusing.
- I. Starter to have two normally closed and two normally open auxiliary contacts.
- J. Combination starter shall be suitable for straight through wiring.
- K. Fusible Disconnecting Means: Heavy Duty, quick-make, quick-break, load break rated, such that during normal operation of the switch, the operation of the contacts shall not be capable of being restrained by the operating handle after the closing and opening action of the contacts has started. The handle and mechanism shall be an integral part of the box (not cover) with facilities for pad locking in the open or closed position with up to three padlocks. Switch doors shall be interlocked with switch handle so that the door can only be opened when the switch is in the "OFF" (open) position.
- L. All safety switches shall have a factory installed neutral lug, when a neutral is necessary.
- M. All current carrying parts shall be plated by an electrolytic process to resist corrosion and to promote cooling.
- N. Provide the following Accessories:
 - 1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
 - 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
 - 3. Lugs: Mechanical type, suitable for number, size, and conductor material.

2.5 COMBINATION SOFT START MOTOR CONTROLLER

- A. Description: Factory Assembled, Solid state, reduced voltage, non-reversing motor controller consisting of controller, disconnecting means, protection devices, microprocessor with digital keypad in a single enclosure.
- B. Enclosure shall include a door mounted digital keypad for adjusting the soft starter parameters and viewing process values and viewing the motor and soft starter status without opening the enclosure door. Provisions shall be available for padlocking the enclosure door.
- C. The enclosed product shall be provided with molded case disconnect switch and in-line fuse block for Class J power fuses from 10 to 600A or Class L power fuses from 601 to 1600A for Type 1 short circuit protection.
- D. The motor must be automatically protected from solid state component failure by an isolation contactor that opens when the motor is stopped or when the controller detects a fault condition including a shorted SCR.

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- E. The soft starter shall utilize an SCR bridge consisting of at least two SCRs per phase to control the starting and stopping of industry standard motors.
- F. The soft start shall provide torque control for linear acceleration independent of motor load or application type without external feedback. The gating of the SCRs will be controlled in such a manner to ensure stable and linear acceleration ramp.
- G. The soft starter shall be controlled by a microprocessor that continuously monitors the current and controls the phasing of the SCRs. Analog control algorithms shall not be allowed.
- H. A shorting contactor shall be standard on soft starters in all enclosure configurations. Protective features and deceleration control options integral to the soft starter shall be available even when the shorting contactor is engaged.
- I. The SCRs shall have a minimum P.I.V. rating of 1800 Vac. Lower rated SCRs with MOV protection are not acceptable.
- J. All programming/configuration devices, display units, and field control wiring terminals shall be accessible on the front of the control module. Exposure to control circuit boards or electrical power devices during routine adjustments is prohibited.
- K. Digital indication shall provide, as a minimum, the following conditions:
 - 1. Soft starter status - ready, starting/stopping, run.
 - 2. Motor status - current, torque, thermal state, power factor, operating time, power in kW.
 - 3. Fault status - Motor thermal overload, soft starter thermal fault, loss of line or motor phase, line frequency fault, low line voltage fault, locked rotor fault, motor underload, maximum start time exceeded, external fault, serial communication fault, line phase reversal fault, motor overcurrent fault.
- L. The soft starter must be preset to the following for adjustment-free operation in most applications:
 - 1. Linear (torque-controlled) acceleration ramp of 15 seconds.
 - 2. Current limitation to 400% of the motor full load current rating.
 - 3. Class 10 overload protection.
 - 4. Motor current preset per NEC / NFPA 70 table 430.150 for standard hp motors.
- M. A digital keypad shall be utilized to configure operating and controller parameters such as FLA, acceleration ramp, torque, braking type, thermal overload Class, reset functions, etc.
- N. Provide output relays to provide the following status indications:
 - 1. One Form A (N.O.) minimum for indication of fault.
 - 2. One Form A (N.O.) for indication that acceleration ramp is complete and current is below 130% motor FLA (end of start).
 - 3. One Form A (N.O.) assignable to one of the following functions: motor thermal alarm, motor current level alarm, and motor underload alarm.
- O. A microprocessor-based thermal protection system shall be included which continuously calculates the temperature-rise of the motor and soft starter and provides:

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1. A motor overload pre-alarm that indicates by relay contact or logic output that the motor windings have exceeded 130% of its rated temperature rise. This function shall be for alarm only.
 2. A motor overload fault will stop the motor if the windings have exceeded 140% of temperature-rise.
 3. An electronic circuit with a time-constant adjustable to the motor's thermal cooling time-constant ensuring the memorization of the thermal state even if power is removed from the soft starter.
 4. The soft starter shall provide line and motor phase loss, phase reversal, underload, stall, and jam protection.
 5. The integral protective features shall be active even when the shorting contactor is used to bypass the SCRs during steady state operation.
 6. The soft starter control circuit shall be fed from the line supply and be completely independent of the power circuit and separate from the control logic.
- P. The peripheral soft starter control circuitry shall be operated at 120 Vac 60 Hz from a control power transformer included within the enclosure.
- Q. Operator devices shall be door mounted and shall be:
1. Red STOP and black START push buttons.
 2. Three position H-O-A switch which provides for manual (HAND) start or remote signal (AUTO) start from user-supplied relay contacts.
 3. Three position FWD-OFF-REV switch provides forward, off and reverse selector switch mounted on the door (available with reversing starter only).
 4. Red RUN pilot light illuminated whenever the soft starter is provided a run command and no fault condition is present.
 5. Green OFF pilot light illuminated whenever the soft starter is supplied with control power and no run command is present.
 6. All operator devices shall be remote-mounted using supplied 120 Vac control logic. Clearly labeled terminals shall be provided for field installation.
- R. Provide a shorting contactor that shall close, shorting the SCRs after the acceleration ramp is complete and motor current is below 130% of motor FLA, and open on a stop command to allow a deceleration ramp. Overload protection integral to the soft starter shall continue to protect the motor when shorting is engaged. A microprocessor shall control the operation of the shorting contactor via an output relay.
- S. Provide full voltage bypass starter with overload protection to provide motor operation in the event of soft starter failure. Provide "NORM/BYPASS" selector switch on enclosure door.

PART 3 - EXECUTION

3.1 MOTOR CONTROLLER APPLICATION

- A. FVNR and Soft Starter type motor controllers shall be combination type starter and disconnect switch unless noted otherwise on plans.

- B. Starters smaller than 10HP shall be full voltage non-reversing type (FVNR). Starters 10HP and larger shall be soft starters.
- C. The starter shall be designed to operate in the environment in which installed including ambient temperature, humidity, and elevation.
- D. Enclosure:
 - 1. Type of each starter to comply with environmental conditions at installed location:
 - a. Indoor, Dry and Clean Locations: NEMA 250, Type 1
 - b. Outdoor Locations: NEMA 250, Type 3R.
 - c. Kitchen and Wash-Down Areas: NEMA 250, Type 4X, stainless steel.
 - 2. Provide provisions for padlocking the enclosure door.

3.2 EXAMINATION

- A. Examine elements and surfaces to receive motor starters for compliance with installation tolerances, relationship to motors, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION OF MOTOR CONTROLLERS:

- A. Install motor starters as indicated, in accordance with manufacturer's written instructions, applicable requirements of NEC, NEMA, and NECA standards, and in compliance with recognized industry practices to ensure that products fulfill requirements.
- B. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- C. Securely fasten each switch, circuit breaker and combination starter to the supporting structure or wall, utilizing a minimum of four (4) 1/4 inch bolts.
- D. Maintain minimum clearances and workspace at equipment according to manufacturer's written instructions and NEC. Do not mount in an inaccessible location or where the passageway to the switch may become obstructed.
- E. Install fuses in fusible devices in accordance with Section 262813, "Fuses".
- F. Select and set overloads on the basis of full-load current rating as shown on motor nameplate.
- G. Verify that overcurrent and overload protection devices are properly matched to actual motor nameplate data and service class.
- H. Provide conductor reducers, taps and splices, as required, for proper termination of all branch circuits and feeders at disconnect switches, panelboards, motor starters, VFDs, etc. This shall include where conductors have been oversized to accommodate voltage drop, motor circuit conductor protection, and all instances where conductors are unable to terminate at factory lugs.

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- I. Final 18 inch of power wiring to motor shall be in liquid tight flexible conduit.

3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B. Where a tightening torque is indicated as a numeric value on equipment or in installation instructions provided by the manufacturer, use a calibrated torque tool to achieve that indicated torque value, unless the equipment manufacturer has provided installation instructions for an alternative method of achieving the required torque.

3.5 IDENTIFICATION

- A. Comply with requirements in Section 260553, "Identification for Electrical Systems"
 1. Identify field-installed conductors, interconnecting wiring, and components.
 2. Provide Warning Signs.
 3. Label each enclosure with nameplate.

3.6 FIELD QUALITY CONTROL:

- A. Perform Test and Inspections:
 1. Visual and Mechanical Inspection:
 - a. Compare equipment nameplate data with drawings and specifications.
 - b. Inspect physical and mechanical condition.
 - c. Inspect anchorage, alignment, and grounding.
 - d. Verify the unit is clean.
 - e. Inspect contactors:
 - 1) Verify mechanical operation.
 - 2) Verify contact gap, wipe, alignment, and pressure are according to manufacturer's published data.
 - f. Motor Protection:
 - 1) Verify overload element rating is correct for its application.
 - 2) If motor-running protection is provided by fuses, verify correct fuse rating.
 - g. Verify tightness of accessible bolted electrical connections by calibrated torque-wrench or low resistance ohmmeter. Bolt-torque levels and/or bolted connection resistance values shall be according to manufacturer's published data.
 - h. Verify appropriate lubrication on moving current-carrying parts and on moving and sliding surfaces.
 2. Electrical Tests:
 - a. Perform insulation-resistance tests for one minute on each pole, phase-to-phase and phase-to-ground with switch closed, and across each open pole. Insulation-resistance values shall be according to manufacturer's published data.
 - b. Test motor protection devices according to manufacturer's published data.
 - c. Verify voltages at the controller locations are within plus or minus 10 percent of the motor nameplate rated voltages. If outside the range for any motor, notify the design team before starting the motor.

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- d. Perform operational tests by initiating control devices.
 - e. Test all auxiliary devices/system interfaces and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.
- B. Motor controller will be considered defective if it does not pass tests and inspections.
- C. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance, otherwise replace with new units and retest.
- D. Prepare test and inspection reports, including a certified report that identifies motor controllers included and that describes results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

END OF SECTION.

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SECTION 32 12 16

ASPHALT PAVING

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 of Existing Asphalt Paving to Match Existing:

1. Cold milling of existing hot-mix asphalt pavement.
2. Hot-mix asphalt patching.
3. Hot-mix asphalt paving overlay.

- B. Related Sections:

1. Division 02 Section "Selective Demolition".

1.3 DEFINITION

- A. Hot-Mix Asphalt Paving Terminology: Refer to ASTM D 8 for definitions of terms.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.
- B. Qualification Data: For qualified Installer.

1.5 QUALITY ASSURANCE

- A. Preinstallation Conference: Conduct conference at Project site.
 1. Review methods and procedures related to hot-mix asphalt paving including, but not limited to, the following:
 - a. Review condition of subgrade and preparatory work.
 - b. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.

1.6 DELIVERY STORAGE AND HANDLING

- A. Deliver pavement-marking materials to Project site in original packages with unbroken seals and bearing manufacturer's labels containing brand name and type of material, date of manufacture, and directions for storage.

- B. Store pavement-marking materials in a clean, dry, protected location within temperature range required by manufacturer. Protect stored materials from direct sunlight.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply asphalt or painting materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure. Minimum surface temperature of 60 deg F and not exceeding 95 deg F. Proceed with pavement marking only on clean, dry surfaces.

PART 2 - PRODUCTS

2.1 AGGREGATES

- A. General: Use materials and gradations that have performed satisfactorily in previous installations.
- B. Coarse Aggregate: Sound; angular crushed stone, or crushed gravel.
- C. Fine Aggregate: Sharp-edged natural sand or sand prepared from stone, or gravel or combinations thereof.
 - 1. For hot-mix asphalt, limit natural sand to a maximum of 20 percent by weight of the total aggregate mass.
- D. Mineral Filler: Rock or slag dust, hydraulic cement, or other inert material.

2.2 ASPHALT MATERIALS

- A. Asphalt Binder: AASHTO M 320 or AASHTO MP 1a, PG 70-22.
- B. Asphalt Cement: ASTM D 3381 for viscosity-graded material.
- C. Prime Coat: Asphalt emulsion prime coat complying with California DOT requirements.
- D. Tack Coat: ASTM D 977 emulsified asphalt, or ASTM D 2397 cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.
- E. Water: Potable.

2.3 AUXILIARY MATERIALS

- A. Sand: Grade Nos. 2 or 3.
- B. Joint Sealant: Type II or III, hot-applied, single-component, polymer-modified bituminous sealant.

2.4 MIXES

- A. Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mixes complying with the following requirements:

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1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.
 - a. Base Course: Field verify and match existing.
 - b. Surface Course: Field verify and match existing.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that subgrade is dry and in suitable condition to begin paving.
- B. Proof-roll subgrade below pavements to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
- C. Proceed with paving only after unsatisfactory conditions have been corrected.

3.2 COLD MILLING

- A. Clean existing pavement surface of loose and deleterious material immediately before cold milling. Remove existing asphalt pavement by milling cold to grades and cross sections indicated.
 1. Mill to a uniform finished surface free of excessive gouges, grooves, and ridges.
 2. Control rate of milling to prevent tearing of existing asphalt course.
 3. Repair or replace construction damaged during cold milling.
 4. Transport milled hot-mix asphalt to asphalt recycling facility.
 5. Keep milled pavement surface free of loose material and dust.

3.3 PATCHING

- A. Hot-Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.
- B. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, hot-mix asphalt paving.
 1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.
- C. Patching: Fill excavated pavements with hot-mix asphalt base mix for full thickness of patch and, while still hot, compact flush with adjacent surface.

3.4 REPAIRS

- A. Leveling Course: Install and compact leveling course consisting of hot-mix asphalt surface course to level sags and fill depressions deeper than 1 inch in existing pavements.

- B. Crack and Joint Filling: Remove existing joint filler material from cracks or joints to a depth of 1/4 inch.
 - 1. Clean cracks and joints in existing hot-mix asphalt pavement.
 - 2. Use emulsified asphalt slurry to seal cracks and joints less than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.
 - 3. Use hot-applied joint sealant to seal cracks and joints more than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.

3.5 SURFACE PREPARATION

- A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive payment.
- B. Prime Coat: Apply uniformly over surface of compacted unbound-aggregate base course. Apply enough material to penetrate and seal but not flood surface. Allow prime coat to cure.
 - 1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.
 - 2. Protect primed substrate from damage until ready to receive paving.
- C. Tack Coat: Apply uniformly to surfaces of existing pavement.
 - 1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
 - 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.6 HOT-MIX ASPHALT PLACING

- A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
 - 1. Place hot-mix asphalt surface course in single lift.
 - 2. Spread mix at minimum temperature of 250 deg F.
 - 3. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
 - 4. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.
- B. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.7 JOINTS

- A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.

3.8 COMPACTION

- A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.
 - 1. Complete compaction before mix temperature cools to 185 deg F.
- B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.
- C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
- D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.
- F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace them with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.
- G. Protection: After the final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
- H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.9 INSTALLATION TOLERANCES

- A. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:
 - 1. Base Course: 1/4 inch.

3.10 DISPOSAL

- A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.
 - 1. Do not allow milled materials to accumulate on-site.

3.11 PAVEMENT MARKING

- A. Allow paving to age for 30 days before starting pavement marking.

1. Sweep and clean surface to eliminate loose material and dust.

END OF SECTION